JOB-LOAD ANALYSIS AND PLANNING OF EXECUTIVE WORK

IN

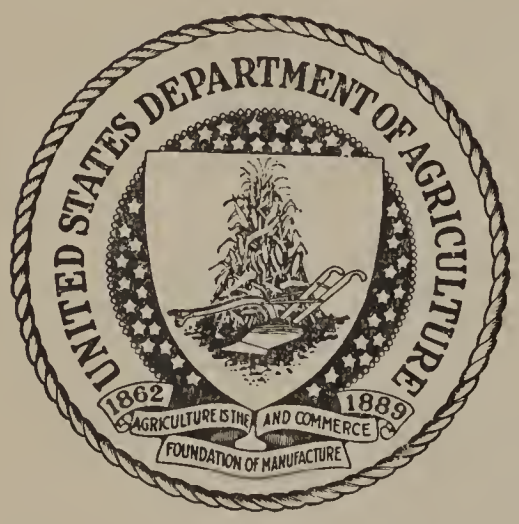
NATIONAL-FOREST ADMINISTRATION

A MANUAL
FOR FOREST OFFICERS

By

E. W. LOVERIDGE

Assistant Chief
Branch of Operation, Forest Service
United States Department of Agriculture



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UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

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PREFACE

Good business management has already saved large sums in the administration of the national forests and has greatly increased the effectiveness of the work being done by the organization which is in charge of them. Within the last few years, for example, consolidations of administrative units have resulted in reducing by 8 the number of national forests, and the number of ranger districts by 80. By such consolidations and reorganizations it has been possible to do urgently needed work otherwise impossible in the amount of approximately a quarter of a million dollars a year. At the same time the service rendered the public has not only been constantly improved, but there has been a downward trend in the curve based on forest-fire losses and area burned.

Job-load analysis and planning have been major factors in the most recent efforts for increased economy and effectiveness. These efforts are still under way and will result in further progress along these lines. In order, therefore, that the methods developed during the course of the job-analysis and planning project may be most effectively used in the organization studies still to be made, this manual has been prepared. No other material of general distribution is available which deals with the subject as it relates to *executive* and *supervisory* work. Widespread and decentralized as the organization of the Forest Service necessarily is, this text should serve as the most effective means of getting suitable technic developed and applied. It will answer numerous questions which would otherwise result repeatedly in lengthy correspondence, and in addition it will provide the only practicable basis on which the essential correlation of action, in a far-flung organization working on a difficult project of this sort, can be obtained.

A broader object of this publication is to give a comprehensive account of the aims, methods, problems, and developments in job-load analysis and planning as applied to certain classes of work in forestry practice and to show the influence this procedure has on getting the work done. While the information adduced relates primarily to the duties of rangers and supervisors in national-forest work, it is believed the subject matter will also be of interest to forest executives generally.

No statement on job analysis and plans of work in national-forest administration would be complete unless it acknowledged the invaluable contributions to the present methods and attitudes made through the years of widespread discussion, development, and use of standards, many of which later found their way into manuals and handbooks. With the background of that movement and with the experience gained by the service-wide development and use of programs of work, job lists, trip plans, effective inspection methods, and similar tools of the good executive, the coalescence of all of this material in the job-load analysis and planning procedure was a logical next step.

The historic principles of the "scientific method," in the more concrete form of job analyses with their time studies and plans, have been further developed and are a fundamental part of the management engineer's profession. He is the recognized authority in this field. For this reason, and to show the similarities and differences between methods, as well as to support those steps which have been developed by trial and error and experience in studies of forest supervision, numerous excerpts from publications by management engineers and other authorities on the subject have been included. This portion of the text is probably out of balance but has been purposely amplified not only because the Forest Service personnel, for which the manual is chiefly written, has learned to respect and derive value from the works of such technicians, but also in order that such material may be readily available to those who have not actually worked with or have not otherwise become intimately acquainted with the aims, methods, and results of the job-analysis and planning project.

The development of job-load analysis and planning as now used in the Forest Service has been possible only because of the earnest cooperation of many men. Group thinking and correlated experience have brought the development to its present stage and will continue to carry it forward. The contributions of individuals to this development have ranged all the way from very small to very large, depending on varying opportunities and inclinations. Acknowledgement of even the more important contributions is hardly practicable because in doing so there is no logical place to stop. It seems best, therefore, to substitute for such individual acknowledgements a repetition of the statement that the job-analysis and planning project would show small returns without the cohesive effort which it has had from many men.

R. Y. Stuart, *Forester.*

CONTENTS

JOB-LOAD ANALYSIS AND PLANNING OF EXECUTIVE WORK IN NATIONAL-FOREST ADMINISTRATION

INTRODUCTION

Competitive demands of problems in the three broad sciences, biology, sociology, and economics, with which the forester has to deal, make his work at times bewilderingly complex. On additional biological studies concerning forest life, depends to a great extent the fulfillment of the ultimate aims of forestry. The sociological or political phases dealing with important questions of policy also demand the attention of the forester. And bearing on both of these demands are the economic or business phases of his work.

To a noteworthy degree the history of American forestry is similar to that of American industry. In the beginning, European practices were brought to the United States and efforts were made to apply them to conditions, problems, and temperaments which, although in some cases similar to those of Europe, were often so entirely different that it was necessary to develop new theories and methods in order to meet local needs more adequately.

The change in practices commonly associated with the history of American industry from painstakingly made, individualized, and correspondingly expensive articles, which received limited use, to modern, satisfactory, uniformly made, and inexpensive products is well known. Likewise, American foresters through the necessity for handling large-scale operations economically have developed methods which differ greatly from those in use in countries where, for example, the value of the products may make it desirable for the forester to know even the individual trees in his stands. As this condition is approached, the biological side of forestry becomes of increasing importance. In the meantime, however, the relatively low financial return from forests in this country, their vast extent, the *urgent need for placing in actual use many of the highly desirable but as yet unattained improvements in field practice that have been developed and tested on an experimental basis through years of effort by the research organization*, the growing demand on the part of many private owners and foresters for "industrial forestry," and other factors all point to the greater importance of economics in forestry practice. This is in substantial agreement with the words of Doctor Fernow (*9, p. 97–98, 100*)[1]: "As in every productive industry so in the forestry industry we can distinguish two separate yet necessarily always closely interdependent branches, namely, the technical art which concerns itself with the production of the material, and the business art which concerns itself with the orderly, organized conduct of the industry of production. * * * A *forester* then is not, as the American public has been prone to apply the word, * * * a botanist; nor * * * a dendrologist; nor * * * a propagandist; nor * * * an aboriculturist; * * * nor * * * a lumberman, nor * * * a forest guard nor even * * * a silviculturist; but in the fullest sense of the

[1] Italic numbers in parentheses refer to Literature Cited, p. 231.

term, a forester is a technically educated man who * * * combines * * * knowledge which enables him to manage a forest property so as to produce certain conditions resulting in the highest attainable revenue from the soil by wood-crops."

Only that phase of forest economics having to do with the use of the scientific method in forest administration is treated here. As expressed by Beard (*3, p. 116, 120*) discussing the use of the scientific method in government: "In principle this method is likewise opposed to the instinctive, emotional, rule-of-thumb operations of historic politics. It is essentially analytical and rational. It calls for the assembly of pertinent facts, the formulation of conclusions on the basis of facts, and the execution of policies in accordance with the requirements of the fact situation. Though undoubtedly limited in its application, the scientific method promises to work a revolution in politics no less significant than that wrought in society at large by mechanics. It punctures classical oratory—conservative as well as radical—and offers to explore worlds unknown to politicians of the historic school. * * * There are human factors that defy chemical analysis or statistical computation, and a government that does not take them into account is as unscientific as one that ignores mechanics, physics and chemistry. Science and machinery do not displace all cultural considerations. * * * The problem before us is that of combining the highest philosophy of life with the efficient use of all the instrumentalities of the modern mind—a challenge to human powers on a new level of creative purpose."

In addition to containing a definition of the phrase, this quotation also is of interest because it proposes the use of "the scientific method" in politics, although it has been held in some quarters that the less fortuitous work of forest administration deals with so many intangibles and is so different from other types of administration that it is not susceptible of analysis. Forestry does have many peculiar distinctive characteristics. Producing forest crops requires large areas of land, in many cases more than a million acres per supervisor. The individual worker must assume managerial responsibilities and adjust himself to varying conditions of weather and to continuously changing seasonal operations. As a matter of fact it is the circumstance that the work is "different" which makes it similar to the problems other executives have to handle. For the "unexpecteds" and intangibles which production executives have to meet, including such elusive variables as style changes, customers' wishes in details of product, and in regard to delivery date, the intangible and tangible results of cyclical employment, the financial aspects of manufacturing ahead of sales, and the demands and competitive conditions within the industry as regards quality, price, and service, to mention only a few of the problems with which industries have to deal, are far from being reduced to simple routine.

Up to the time of Frederick W. Taylor, the analysis of various classes of work, routine and variable, was more or less hit and miss, simply a matter of judgment without much thought. It was applied altogether to factory operations with the object in view of increasing production and thus lowering costs. Time and motion studies, standard practice instructions, and many other devices and aids of scientific management owe their being to the fact that job analysis as later developed found the surest routes to the attainment of industrial competency.

DEFINITIONS

Unfortunately there is no complete standardization of nomenclature in management. The American Council on Education (*1*) has defined various terms, but these are not used with the same meaning universally. The term "job analysis," for example, has been variously described and defined. Hopf (*13, p. 3*) calls it "* * * that process which results in establishing the component elements of a job and ascertaining the human qualifications necessary for its successful performance." Bergen (*4, p. 85*) states that "job study divides itself naturally into the three major phases of job analysis, position specification, and position classification." He defines job analysis as "* * * the process of studying the component elements of a position and establishing its functions, operations, and attendant factors, together with the requisite physical and mental qualifications involved." Kelly (*15, p. 2*) defines job analysis "as a scientific study and statement of all the factors entering into the performance of the job, which includes not only the personal qualifications but the material handled, equipment used, method, working conditions, and the relation to every other job in the organization." Strong and Uhrbock (*29, p. 21*) describe it as "The method of determining what executives do and must know and their relationship to each other * * *."

Hopf (*13, p. 3*) further states: "I am conscious that this definition varies to some extent from others which have been set up, and I do not by any means desire to be understood as imputing any elements of superiority to it. In quoting the definition, it is rather my desire to employ a phraseology which seems to me to adapt itself logically to use in connection with the exploitation of my topic."

This last sentence seems to express a common practice and one which has been followed in this text and others [2] in defining job-load analysis as the sum of the processes which result in determining the component elements of each job, the one best way of doing it, the proper time requirements for doing it in this manner and finally, the integration of the individual jobs from a maze of separate entities into a composite plan of action.

JOB ANALYSIS OF EXECUTIVE WORK

Although the use of job analysis started in the factory with the more tangible operations found there, in recent years it has spread in various forms to many classes of endeavor. Thus, Strong and Uhrbock (*29*) show how this method can be used for developing well-balanced educational courses and the American Council on Education has printed several articles describing its work in analyzing jobs and preparing job specifications from the laborer, through the supervisor, general council, and other positions to the managership grade. At a convention of the American Management Association, it was brought out that job analysis is of fundamental importance in relation to the position and duties of the higher executives in any organization and that although an assay of time requirements is important, of

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[2] CHARLTON, R. H. INSTRUCTIONS AND SAMPLE FORMS FOR PREPARATION OF RANGER DISTRICT ANALYSIS. U. S. Dept. Agr., Forest Serv. 1930. [Mimeographed.]

PITCHLYNN, P. P. HANDBOOK, RANGER DISTRICT JOB ANALYSIS AND PLANS, REGION 5. U. S. Dept. Agr., Forest Serv. 1930. [Mimeographed.]

greater need is the organization of the work to see that it is planned out in sufficient detail to avoid delays and make things run smoothly. Another important reference (*27, p. 394*) on this point brings out that until recently it was the custom to measure executive performance by the annual financial reports. It was assumed there must be ups and downs in general business conditions which justified ups and downs in the performance. There was no means of appraisal by comparison with *what could have been*, or what was attempted. During the severe depression which followed the World war systems of planning and of recording and appraising results of executive effort, which before had not seemed essential, were instituted. Executives came to realize that financial statements were not a sufficient basis for judgment. These standards of measurements included the budget and detailed operating schedules. The significance of these devices is that they establish for the executives a counterpart of the planning department which scientific management many years ago established for the production department. To-day every function is provided with a definite target.

There is this fundamental difference, however, that executives are more concerned with imponderables and variables than are production operatives. In the plant is a large area of constants, and its area of imponderables and variables although sufficiently perplexing is much reduced; but the executive must work with a larger proportion of unknowns—industrial conditions and tendencies, the state of the market, the influence of legislation, and public opinion. Therefore the standards to which executives must work can not be as precise as are those to which the production groups work. There is not a comparable factual basis for plans; judgment and even guessing are involved.

The literature on the subject and inquiry concerning it disclose that job descriptions and specifications of executive positions without the time analyses are being made, *but the procedure to follow in making combined job and time analyses of executive positions, here termed job-load analysis, does not seem to have been developed or at least discussed publicly to any great extent.* For this reason the following notes have been prepared, based on the experiences of the last four years in the making of job-load analyses of executive positions of varying complexity and weight. All are of a field-going class, which makes them peculiarly susceptible to comprehensive analysis and planning. (Table 1.)

O—Special.
Administrative Studies, September 19, 1929,
Volume of business.

TABLE 1.—*Summary of more important items of work*

(Santa Fe National Forest)

Symbols	Recurrent work activities, 1928[1] basis (see instructions for certain entries). Figures should check reasonably well with statistical or similar reports	Name of ranger district (all project[1] sales grouped in one column)							
		Colonias	Jemez River	Las Vegas	Pecos	Rio Grande	Tesuque	Chama	Forest totals
S-1	Number of sawmills handled by district ranger cutting F. S. timber; 50 M to 200 M a year	1	1	1	1				4
S-2	Number of sawmills handled by district ranger cutting F. S. timber; 51 M to 500 M a year						1		1
S-3	Number of sawmills handled by district ranger cutting F. S. timber; 501 M to 1,000 M a year	1				1			2
S-4	Number of sawmills handled by district ranger cutting F. S. timber; 1,001 M to 1,500 M a year								
S-5	Number of sawmills handled by district ranger cutting F. S. timber; 1,501 M to 2,500 M a year								
S-6	See instructions								
S-7	See instructions								
S-8	Number of nonsaw-log or nonrailroad-tie sales for less than 2M	9	10	2	13	21	48	29	132
S-9	Number of nonsaw-log or nonrailroad-tie sales for 2 M to 10 M	2	6	1	20	9	21	13	72
S-10	Number of nonsaw-log or nonrailroad-tie sales for 11 M to 50 M	2	0	0	4	2	0	0	8
S-11	Number of nonsaw-log or nonrailroad-tie sales for 51 M to 100 M	2	0	0	0	1	0	0	3
S-12	Number of nonsaw-log or nonrailroad-tie sales for over 110 M—Name product (mine timbers, etc.)	0	0	0	1	0	0	0	1
S-13	Number of project sales on forest, 1928								
S-14	Project sale cut in M, 1928. Not handled by district rangers								
S-15	Volume cut (M) in nonsaw-log or of nonrailroad-tie sales handled by district ranger	169	34	5	1,584	583	91	48	2,469
S-16	Volume cut (M) in sawmill or railroad-tie sales handled by district ranger	1,260	41	8	80	1,042	254	2	2,687
S-17	Total annual cut (M)—all sales (sum of S-14, 15, 16)	1,429	75	13	1,664	1,580	345	50	5,156
S-18	Woods crew of operators work in what months?	Y. L.	Y. L.	Y. L.	Y. L.	Y. L.	Y. L.	Y. L.	Y. L.
S-19	Approximate per cent of volume of nonsaw-log sales cut from dead timber. (See S-15)	Practically none.							
S-20	Principal specie being cut	W. Y. P.	W. Y. P.	W. Y. P.	D. F.	W. Y. P.	W. Y. P.	W. Y. P.	
S-21	Principal product cut	Lumber.	Lumber.	House logs.	Mine timber.	Lumber.	Lumber.	House logs.	
S-22	Average volume cut per acre (M)—sawmill sales	3.5	5	3		3	2.5	0	
S-23	Number 16-foot logs per M—sawmill sales	10	8	12	10	14	14		
G-1A	Number stock-miles driveway 1928, in terms of cattle	30,000	36,000			65,000	17,000	31,000	179,000
G-1	Number of C. & H. under permit yearlong	151	671	171	253	466	240	632	2,584
G-2	Number of S. & G. under permit yearlong	1,308	2,157	265	1,656	548		7,521	13,455

[1] 1928 basis is used for servicewide averages, as service total cut, etc.; does not vary greatly from year to year. There is often a great variation annually between ranger districts. For this reason the above reported figures will not always check with those used in the actual analyses of the individual ranger districts as averages for a longer period or forecasts of pending work should be used in them.

TABLE 1.—*Summary of more important items of work*—Continued

Symbols	Recurrent work activities, 1928 basis (see instructions for certain entries). Figures should check reasonably well with statistical or similar reports	Name of ranger district (all project sales grouped in one column)							
		Colonias	Jemez River	Las Vegas	Pecos	Rio Grande	Tesuque	Chama	Forest totals
G-3 [2]	Number of C. & H. under permit 5 to 6 months, inclusive	130	749	247	341	650	360	427	2,904
G-4 [2]	Number of S. & G. under permit 5 to 6 months, inclusive	4,102	3,022		1,459	545		11,171	20,299
G-5	Number of C. & H. under permit 3 to 4 months, inclusive		26	90	193		7		316
G-6	Number of S. & G. under permit 3 to 4 months, inclusive	2,554	11,282			5,707		5,310	24,853
G-7	Number of C. & H. under permit less than 3 months	12		20	303				335
G-8	Number of S. & G. under permit less than 3 months				2,190			1,154	3,344
G-9	Number of grazing permits, 1928. Omit permits for exempt stock	39	105	10	72	72	127	164	589
G-10	Number of gross surface acres per stock	99	52	159	94	64	245	62	86
G-11	Per cent of district which is used by stock	80	100	50	60	90	40	80	
G-12	Number of stock associations		1			1			2
G-13	Number of exempt owners who do not also have paid permits	1	32		2	4	0	620	59
G-14	Per cent of G. allotments completely fenced								
G-15	Are range conditions improving?	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	
G-16	Combined number of deer and elk on district	100	150	1,100	500	130	100	700	2,790
G-17	Mileage of range fences (Boundary, segregation, and division) on district		4	3	6	14	3	5	35
O-1	Miles of telephone (tree) U. S. F. S.	20	61	32	13	56	42	53	277
O-2	Miles of telephone (pole) U. S. F. S	10	15	10	20	14	11	17	97
O-3	Miles of trails and truck ways maintained by F. S	20	105	150	110	174	132	75	766
O-4	Miles of roads maintained by F. S	16	43	4	8	43	8	1	123
O-5	Number of road construction crews handled by project men		1						1
O-6	Number of crews (const. or maint.) of 4 men or less on road or trail work less than 2 months								
O-7	Number of crews (const. or maint.) of 4 men or less on road or trail work 2 to 4 months	1	1	1	1	1	1	2	8
O-8	Number of crews (const. or maint.) of 4 men or less on road or trail work over 4 months					1			1
O-9	Number of crews (const. or maint.) of 5 men or more on road or trail work less than 2 months								
O-10	Number of crews (const. or maint.) of 5 men or more on road or trail work 2 to 4 months								
O-11	Number of crews (const. or maint.) of 5 men or more on road or trail work over 4 months						1		1
O-12	Number of other impt. const. crews handled by ranger (summer)		[3] 1 H. B. O.		[3] 1 Fence.	[3] 1 Fence.		[3] 1 R. Imp. [2] 1 Tel.	5
O-13	Number of other impt. const. crews handled by project man (summer)								
F-1	Average number of class A and B fires. Annual average 1924–1928 inclusive	3⅖	11	3⅗	3⅖	12⅖	3⅘	9⅕	46⅘
F-2	Average number of class C fires. Annual average 1924–1928 inclusive	⅘	2⅕	2	0	⅘	⅕	⅘	6⅘
F-3	Number of regular fire-guard stations exclusive short-term registrars		3	2		2		3	10
F-4	Number of regular short-term paid registrar stations on duty partly between June 1 and September 30								

F-5	Miles of roadside burning between May 1 and June 1 supervised directly by U. S. F. S								
L-A	Total number of special uses in effect	10	58	45	63	38	9	33	256
L-1	Number of residence and resort S. U. permits in effect	1	5	22	30	9	3		70
L-2	Number of pasture and cultivation S. U. permits in effect	5	34	6	17	28	2	9	101
L-3	Number of mine claims final proofs reported on, 1928								
L-4	Number of exchange cases under 330 acres reported on Form 950 in 1928		1		2	1	1		5
L-5	Number of other exchange cases reported on in 1928								
L-6	Number of improved public camp grounds		2	2	3	1	1		9
L-7	Number of S. U. permits in effect exclusive of L-1 and L-2. New and original	1	8	1	2	3	1	3	19
P-1	Area. Gross acres under administration. Within N. F. boundaries	188	238	85	205	158	150	370	1,394
P-2	Additional fire cooperation areas under administration. Outside N. F. boundaries		110	14		21			145
P-3	Ease of travel	12	14	16	16	16	18	14	16
P-4	Population on and within 40 miles of district and forest (avoid duplication)	2	3	20	3	5	15	3	51
P-5	Number of visitors	500	2,650	1,750	8,300	3,000	5,580	325	22,105
P-6	Number of outside boundary miles	131	124	54	10	116	65	143	643
P-7	Number of trespass cases in 1928	2	3		3	2	4	5	19
P-8	Miles 1 way to nearest small store		1	18		50		1	70
P-9	Number administrative help in man-months. (See instructions before listing)	12	14	12	12	12	12	14	88
P-10	Approximate number of miles of passable auto roads (within district boundary)	70	73	10	22	38	25	40	278
P-11 [4]	Per cent of district on which practically all work can be handled well from car	40	30	10	10	20	5	20	135
P-12	Does ranger "transfer station" in summer?	No.	No.	No.	Yes.	Yes.	No.	No.	
P-13	Is there a F. S. employee at or near R. S. during fire season?	No.	No.	No.	No.	No.	No.	No.	
P-14	Normal opening date of field season	4/1	4/1	4/1	4/1	4/1	4/1	4/1	4/1
P-15	Inclusive dates of normal fire season	5/10–7/10	5/10–7/10	5/10–7/10	5/10–7/10	5/10–7/10	5/10–7/10	5/10–7/10	5/10–7/10

NOTE.—Use additional lines or attach brief memo for any other or unusual conditions which affect administration of a district.

[2] G-3, G-4. Discrepancy in totals due to fact that some stock are grazed on 2 or more districts.
[3] O-12. House, barn, and office.
[4] P-11. We first attempted to work this out on basis of area of district within 2½ miles of road but it gave figures wholly out of line. The figures as given are our best estimate on volume of work basis.

Approved: Frank E. Andrews,
Forest Supervisor.
Date: December 15, 1929.

(Reverse side of volume of business form)

COMMENTS ON ITEMS INCLUDED IN VOLUME OF BUSINESS SUMMARY FORM

Use rounded-off figures. See statistical reports, etc., for data. Use a separate column for each ranger district. Put all project sales in one column. "Project" sale or road or insect, etc., work is work which is not supervised by the district ranger, but by some other officer who is directly responsible to the supervisor.

Comment on the numbered items follows (give the name of the ranger district; not its number):

S-1 to S-5. Show number of mills (not volume cut). Use 1928 data.
S-6 and S-7. Complete for larger sales. Itemize as for S-1 to S-5.
S-8 to S-11. Cordwood, posts, etc.
S-12. Cordwood, posts, etc.
S-14.
S-18. Abbreviate Y. L.=yearlong. Mar. to Nov.=March to November, etc.
S-19. Does not need marking before cutting.
S-20. D. F., W. Y. P., etc.
S-21. Lumber, ties, etc.
G. Do not duplicate between districts or seasons.
G-1. Include "nonuse" stock if it is likely to return to range later.
G-2.
G-9.
G-10. Convert sheep to cattle basis by dividing number of sheep by 5. Then add result to number of cattle to get number of "stock." Divide the gross area by this number.
G-11. If only scattered areas of unused range, report as 100 per cent.
G-14. For example, if 5 of the 10 allotments are under fenced control use 50 per cent.
O-5, 6. Not "project" crews but supervised by ranger.
O-12. List only those crews handled by the ranger. Include only summer-season work. Attach list showing the class of work they were engaged in.
F-3. Number of regular fire lookout, patrol, and other guard stations manned—not number of protection men—include headquarters guard.
L-6. Only camp grounds administered by the U. S. F. S.; not permitted grounds.
P-1. Show in thousand acres, within the forest boundaries.
P-2. Areas outside the forest but under fire cooperation agreements with and handled by U. S. F. S. In thousand acres.
P-3. Rate district: 0 if level, 7 if rolling, 14 if rough, 20 if on end. Use intermediate figures.
P-4. If in thousands use (M). Do not duplicate figures between districts.
P-5. Use figures from annual statistical report, excluding the data in the column headed "Transient tourists."
P-6. Do not count interforest or interdistrict lines.
P-7. Do not count delinquents unless legal proceedings were started. Do include fire-law enforcement cases, game, etc.
P-9. Include ranger, assistant ranger, and administrative guards; but not fire guards or temporary laborers. Reduce to man-months.
P-10. Regardless of who maintains them.
P-11. Working out afoot from car.
P-12. "Transfer station," i. e., changes his official station in the summer.
P-13. State yes or no. May be a guard, telephone operator, dispatcher, commissary man, etc.
P-15. Show the date for which regular allotments are made.

The forest totals should roughly agree with the district and project totals.

PROBLEMS AND AIMS

"The responsibilities assumed by scientific management involve the new conception of every business. It replaces empiricism by predetermination of results; the haphazard of the mechanic by the engineer's applications of scientific laws. Each process of work is analyzed into its ultimate units. Each smallest step of the process is compared with an ideal standard of performance, and allowance being made for practical conditions, an obtainable commercial standard is set for each unit of work and for the whole work reassembled in its entirety." [3]

From Table 1, by ranger districts for one of the national forests or, in more detail, from the sample job-load analyses in the appendix, it can be seen that even with the best form of control the management of large and often widely separated forest properties has to guard against numerous sources of weakness and waste if the property is to be handled on that plane of high efficiency and accomplishment to which the owners are entitled. This need is present in all organizations of any size; each of which has its own list of managerial problems, corresponding to the following ones which have developed in varying degrees in the administration of the national forests.

SPECIAL PROBLEMS AND AIMS

AIM 1. TO GET THE WORK DONE PROPERLY

Forest organizations are no freer than many others from the loose ends and work just not done, which not only management research has disclosed but which the wide-awake observer has also known to exist, in unmeasured degree. One of the main causes for concern has been the slighting of highly important activities on the plea that there has been an overload of work. In some cases such an overload or inadequate financing has been the cause. In others, however, it may have been due to an unbalanced stressing of some functions by an aggressive branch chief; to the riding of hobbies; to adherence to antiquated standards; to lack of ability, skill, or will; to improper methods and equipment; or to a great variety of other possible causes.

AIM 2. TO MAKE THE POSITIONS AS INTERESTING AS PRACTICABLE TO THE CLASS OF MEN WHO SHOULD OCCUPY THEM

As in other lines of work, the attitude of officials in many phases of forest administration, such as the high-tension job of fire control in which humdrum compliance with instructions would frequently lead to disaster, is of immense concern. So much has been written, and rightly so, concerning the importance to any major undertaking of developing and holding a contented, interested, and even enthusiastic personnel, that this subject requires no further discussion in these pages. It is of vital importance among the aims of the job-analysis study.

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[3] BRANDEIS, L. D. Interstate Com. Comm. Docket No. 3400. BRIEF ON BEHALF OF THE TRAFFIC COMMITTEE OF COMMERCIAL ORGANIZATIONS OF ATLANTIC SEABOARD, p. 7, 1911.

AIM 3. TO MAKE EACH FOREST A WELL-BALANCED, PRACTICABLE MODEL

The desire of many forest executives for a concrete picture of a forest unit which is considered reasonably perfect in all its details has resulted frequently in the demand for a "model forest." Here they would expect to see the proper form of organization, adequate equipment, proper practices in effect, and all those other details of practical perfection which they are striving for on their own units, but striving in some cases with the feeling that the attainment of this end, considering financial and other limitations, is too much to expect at a reasonably early date. This attitude may very likely be justified, but not assuredly so without detailed and analytical consideration of the great number of purposes which the forest unit in question should serve and the greater number of means required to serve these purposes adequately. No forest obviously will meet the requirements of a model for even a great majority of the forests, which occur from foothills to timber line. Some are relatively damp; others highly inflammable; some have numerous timber sales; on others no commercial logging of any kind will take place for years. Automobiles in some instances are the best means of transportation; in other cases horse and pack travel is most practicable. The variety is unending. The aim in these studies, therefore, is to determine what is needed to place each forest in the "model" status, bearing in mind that practical, common-sense considerations have been found to serve as very effective checks and balances in determining what is "proper" and "model." Also it should be determined whether, with the available resources including a high type of management, it is not possible to reach this "model" condition at a time not too discouragingly far in the future.

AIM 4. TO OVERCOME THE GREAT VARIATION IN WORK LOAD BETWEEN ADMINISTRATIVE UNITS OF EQUAL MAN POWER, I. E., TO OBTAIN A CLOSER RELATIONSHIP BETWEEN THE AMOUNT OF WORK TO BE DONE AND THE FUNDS AVAILABLE FOR DOING IT

Not many years back the average area of the ranger districts in one national-forest region was 162,000 acres, while in another region the average was 266,000 acres. Area alone is no sure indicator of volume of work, but careful analysis found that providing the work was done properly there were differences in some places correspondingly great in the work itself, varying for example, from 96 days of work per man in the peak season on one ranger district to 189 days on another district not far away. To one unacquainted with the variety and intricacy of the work involved, or with the parallel disclosures that analyses have made in industrial work, this may seem to be just ordinary poor management. It is a common occurrence, however, as may be judged from the statement made by Kenagy (*13, p. 22–23*) at the American Management Association convention in 1927: "I have here, for example, a time analysis showing how ten different branch managers in the office appliance field spend their time. I find that Manager A gives 15 per cent of his time to personnel work; Manager B 60 per cent; Manager C, 5 per cent. On office routine the percentages run all the way from 5 to 50 per cent; finance, 3 to 40 per cent; personal selling, 5 to 70 per cent; sales promotion, from no time at all to 30 per cent. And these are ten managers with practically the same functions, viewed as a total job. * * * When we come to variation in management methods, we find one trains his new men

personally, three send them out with old salesmen, three have trained men supplied to them, three actually get out into the field with the old men and retrain."

AIM 5. TO OBTAIN A FAIRER DISTRIBUTION OF THE WORK LOAD AMONG THE MEN RESPONSIBLE FOR HANDLING IT

This is a corollary of the preceding problem. Analytical inspections, and studies such as the one quoted by Mr. Kenagy, quite invariably find that organizations based primarily on rules-of-thumb impressions or the debating powers of individuals will have part of the management working to the point of exhaustion and break down, while others receiving the same reimbursement will be coasting under a light load. Needless to say, there are numerous variations between these extremes. This point may be made clearer by consideration of the case of the forester who was so loaded with urgent and important timber-sale work, range administration, fire control, and other land-usage activities that he was busy from daybreak till late at night. Being a man who would not concede that any job was too big for him, he was not complaining but was, nevertheless, showing the effects of overwork. Within the same forest organization other men of equal rank were found whose time was apparently fully occupied by work which they held was highly important and effectively handled. The inspector could doubt this, but his was only one against several other opinions. Facts not available at the time, but later disclosed by analysis, showed that his judgment was correct and that a redistribution of the work load between these men should be made, and thus obviate the necessity for increased personnel on the overloaded unit.

AIM 6. TO REMAIN ABREAST OF THE BEST ADMINISTRATIVE PRACTICES IN OTHER LINES OF ACTIVITY

Although foresters are dealing with a crop which it takes years to produce, they feel that they should not be correspondingly slow in finding or adopting new measures which will increase the profitableness of their properties. In a profession which is engaged to a great extent in public service this must often be done without the personal-profit incentive which carries so much weight in industry. This would no doubt be rated in many quarters as an almost insurmountable obstacle and is, of course, contrary to that principle of scientific management which holds that the workers should share with the owners any increase in profits due to greater skill used in production. This point is discussed later.

AIM 7. TO REMAIN ABREAST OF CHANGING CONDITIONS

Between January 1, 1921, and June 30, 1930, $9,956,198 of Federal funds were spent on road and trail construction in the national forests. As a result automobiles have displaced horse and foot travel to such an extent that in many hitherto inaccessible and mountainous regions it is now possible to cover 150 to 250 miles a day where formerly 25 to 35 miles would have been the average distance traveled. The woods workers and other people with whom the forester deals understand his aims more clearly than when the forests were being placed under administration and need correspondingly less attention. Telephone lines are becoming more common, and protection control has tightened up to such a degree that long sieges on fires are increasingly infrequent. In these and in many other ways conditions which vitally affect previously established

forms and limitations of organization and management have changed and will continue to change. Industry has taken advantage of similar developments by the making of mergers and consolidations, by reducing overhead, and otherwise. There is, of course, an analogy to be found in forest administration.

AIM 8. TO DETERMINE WHETHER HEADQUARTER BUILDINGS, TELEPHONE LINES AND OTHER PERMANENT IMPROVEMENTS ARE PROPERLY PLACED IN RELATION TO THE NORMAL RECURRENT WORK

A new line-up of the work or its full development in another locality may be the cause for the abandonment of investments which the forester can not afford to lose. Combining administrative units (ranger districts and forests), completion of timber cutting, and other not unusual steps which throw the balance of work to another locality have left many "white elephant" improvements on hand. That other concerns have made similar mistakes (one of the transcontinental railroads has built three and abandoned two grades through the mountains of Montana) is of little comfort to the executive who is trying to make a good financial showing.

AIM 9. TO RELEASE FUNDS FOR DEVELOPMENT WORK AND FOR SALARY INCREASES

If additional financing is not available in adequate amounts for desired research or other classes of development work, or for increases in compensation for the workers, and it usually is not, then such funds can only be obtained from savings made as a result of better management.

AIM 10. TO DETERMINE TRAINING NEEDS

That this is an exceedingly important problem is apparent when working with bright young men who are willing and anxious to get the results expected of them, but do not know how to do so. This is true, too, with older employees who are often stationed in isolated localities and have not kept themselves informed of, or used the best practices in handling their units.

AIM 11. TO DISCOVER AND MAKE AVAILABLE FOR FUTURE USE THE BEST TECHNIC DEVELOPED BY SUCCESSFUL MANAGERS, INCLUDING THE EXPERIENCE OF LOCAL MEN

A homely but forceful example of this need is frequently found in the lost time and missteps of a young forester when he takes over a unit which has been administered successfully by his predecessor, who left no record of all the excellent practices he had developed through years of effort in that particular place.

GENERAL PROBLEMS AND AIMS

The foregoing outline makes no pretense of being exhaustive, for the problems, direct and indirect, inherent in an organization are so broad that they touch upon practically all features of management. Some of the additional needs of forest administration which are common to many lines of work are given as follows:

"To make possible a higher standard of living as a result of increased income to workers; * * *

"To assure the highest opportunity for individual capacity through scientific methods of work analysis and of selection, training, assignment, transfer, and promotion of workers; * * *

"To develop self-confidence and self-respect among workers through opportunity afforded for understanding of one's own work specifically, and of plans and methods of work generally.

"To develop self-expression and self-realization among workers through the stimulative influence of an atmosphere of research and valuation, through understanding of plans and methods, * * *

"To build character through the proper conduct of work;

"To promote justice through the elimination of discriminations in wage rates and elsewhere; * * *

"To promote * * * the spirit of teamwork; * * * (*24, p. 16–17*).

"One of the principal concerns of the business administrator should be to analyze and study the trends in his own organization so that he may be in a position to correct tendencies which are not in harmony with the achievements of increasingly successful operating results. On the human side, this consideration gives warrant for more extended reference to the problem of the executive overload * * *. No one who is at all familiar with life-insurance statistics can fail to recall the material increase in mortality during middle life which has taken place in the past few decades because of organic diseases of the heart and kidneys. This condition may be traced directly to the high pressure attending the * * * complexities of modern business affairs, * * * the load which many executives are compelled to carry and, finally, their unwillingness to be controlled by the rule of moderation (*13, p. 16–17*).

"The overload also has its bad effects upon the assistant supervisory force for 'instead of being trained to carry a large part of the burden, these men are only too often compelled to stand by with stifled initiative and observe their superiors gradually wearing themselves out. * * * a determined attempt must be made to effect an even distribution of the executive load so that balanced teamwork may be substituted for the often poorly integrated and nugatory efforts of well-meaning but individualistic executives whose personalities and temperaments must be held in check for the common good (*13, p. 17*).

"The neglect of management * * * often results in a condition of excessive centralization which tends to place grave strains upon those at the top and to atrophy the development of the operating units * * *. On the other hand it is not unusual * * * to find that the reverse condition, i. e., extensive decentralization, exists" (*13, p. 16*).

While always recognizing and capitalizing human differences, obtain the "integration of individual interests and desires with group interests and desires and of individual capacities with the requirements of group purposes" (*24, p. 11*).

METHODS

With the problems clearly recognized, the use of job-load study and planning in the solution of such problems depends on the analysis of the job requirements on the basis of facts, and the elimination, so far as practicable, of guesswork or opinions. This requires patience and painstaking care. There is no royal road to good job analysis. Short cuts lead to inaccuracies and distorted pictures.

Recent experience in forest administration, as well as the accumulated experience of others, shows the following as the minimum steps which should be taken for a reasonably adequate job-load analysis in this type of work.

SYNOPSIS

PRELIMINARY WORK

Obtain a background and general view of the work and conditions affecting it.

Part 1. The Job Descriptions

Step 1. Objectives—defining the desires and reasonably attainable objective in each main branch of forest activities.
Step 2. Breaking each activity up into the component jobs which must be performed to attain the objective, and
Step 3. Determining and recording the job specifications—in terms of standards of perfection and intensity, methods, and practice—needed to attain the objective.
Step 4. Determining and recording the unit time requirements for doing each job properly.

Part 2. The Job List

Step 5. Grouping the separate jobs into the periods (months) during which they should be done.

Part 3. The Plan

Step 6. Reassembling the separate jobs into an integrated plan of action—scheduling—planning and routing, including trip plans.

MISCELLANEOUS

Step 7. Conclusions and recommendations, foreword and instructions.
Step 8. Making the plan work—follow-up.
Step 9. Correlation—review—reasonably uniform methods.
Step 10. Obtaining the desired quality of work—inspection.
Details and discussions of each of these steps follow.

PRELIMINARY WORK

Obtain a background and general view of the work and conditions affecting it.

Before making the analysis of any particular administrative unit some idea of the local peculiarities that the forester has to deal with should be obtained. This can be done to some extent by:

(1) Showing on a base map where the work is located—the sawmills, the guard stations, the probable location of improvement crews, the important special uses and public camps, telephone lines, and roads and trails to be maintained, the area grazed divided into the allotments and seasonal ranges which the permittees are required to adhere to, and other controlling factors on the area.

(2) Riding or otherwise traveling over the unit the way it should be covered—not rushed—and noting the time-consuming items. *The point to guard against here is not to accept past practice as the proper practice*, but to decide how each job should be done in a balanced way and then to make a time study of how long it takes to do it. Inspection of guard stations, range inspection, sale-operation inspection, and so on through the line-up of work—all of it is susceptible to this form of study.

(3) Making a detailed diary analysis, segregating those jobs which can not be foreseen and the intangibles from the routine work where possible. Decide, from discussion with the employee, what he feels are the time consumers or *interferers* on his unit. Make a caption for each of these items and *determine what they amount to for a season. As a guide for future action, consider whether they have been overdone or neglected.*

PART 1. THE JOB DESCRIPTIONS

STEP 1. OBJECTIVES—DEFINING THE DESIRED AND REASONABLY ATTAINABLE OBJECTIVE IN EACH MAIN BRANCH OF FOREST ACTIVITIES

These "main branches" may be, for example: *Forest management*, including timber sales, planting, insect control; *range management*, including grazing and wild life; *land use*, including recreation, acquisition; *operation*, including improvements, finance, personnel; *fire control; engineering; accounts. Research* and *public relations* may be treated as a part of each branch or handled as separate branches.

It will be noted in the numbered steps above that all pyramid toward attaining the objective. To fulfill all of its possibilities, the objective should, therefore, be thoughtfully prepared and specific. It is also essential that the objective be reasonably attainable, or it will tend to discourage rather than to give that incentive to distinguished effort which a visible goal adds to any contest.

Despite the commonplaceness of these principles, it is not unusual to find them violated in such "objectives" as: "Reduce the area burned to the minimum," or "reduce the area burned to 0.05 per cent," for forests which under fairly good management have so far burned an average per year of possibly 0.5 per cent of their area. Little consideration is needed to show that these set-ups are weak in at least two main features. First, no mention is made of permissible costs, and since almost anything can be obtained in the line of reduced area

burned, if costs are disregarded, costs should run at least a close second in importance with the burned-area statement in any fire-control objective. The other weakness is in the lack of a definite goal in terms of permissible burned area. "Minimum" provides no gauge by which results may be measured. In the "0.05 per cent" program, the reduction aimed at is so much greater than can reasonably be expected within the early future that under normal conditions such an objective will leave a sense of futility with the organization. A better wording would be: "During the period 1932–1937, reduce the average area burned per year to not more than 0.2 per cent at an average cost per year of not more than 2 cents per acre."

STEP 2. BREAKING EACH ACTIVITY UP INTO THE COMPONENT JOBS WHICH MUST BE PERFORMED TO ATTAIN THE OBJECTIVE AND

STEP 3. DETERMINING AND RECORDING THE JOB SPECIFICATIONS—IN TERMS OF STANDARDS OF PERFECTION AND INTENSITY, METHODS AND PRACTICE—NEEDED TO ATTAIN THE OBJECTIVE

"The present-day methods of job analysis enlist the cooperation of the entire organization" (*4, p. 88*). In the course of the study, therefore, the points of view of the local officer, of his supervisor, and of the higher officials should be sought by the analyst, and these viewpoints merged and reconciled.

It is difficult not to digress at this point and discuss fully the tremendous value of this procedure. It results in widespread education on the part of all the participants. It promotes a common understanding of the work between subordinate and supervisor. It disentangles misunderstandings which are almost certain to have developed from long-distance supervision inherent in the work. Such consideration establishes, clarifies, and defines in specific form both the minor and the major duties of the employee, and he acquires an understanding of his work which he could scarcely have had before. Its value is so outstanding that it has become recognized as one of the main aims or benefits of the job-load-analysis project. In this connection, nevertheless, it is well to bear in mind that one of Casson's Seven Mistakes in Management includes, "substituting a discussion for an investigation." Five or six opinions are not necessarily better than one. All may be quite worthless. It was no doubt similar convictions which led to at least two of Taylor's principles (*16*). The first is to secure the facts. Investigation, research, and experiment, including analysis, measurement, and comparison, constitute the only sound basis for solving managerial problems. The results of research, investigation, and experiments must be made available in the form of defined and published standards. These standards serve as common goals or methods, and replace chance so far as possible. This is the second of the Taylor principles—the establishment of standards.

The definition of a standard in scientific management according to Hathaway, as quoted by Bryant and Schulz (*7, p. 196*) is "that which is set up as * * * a criterion, established as a result of scientific investigation representing the present stage in the development of the art." This subject is further amplified in the manual of Management Engineers (*7, p. 196*) to the effect that, a condition or procedure can not be considered as standard until research, experiment, and use have proved conclusively that for the particular purpose it is superior to any other condition or procedure. A third authority (*15, p. 3*) states that a

standard is "a carefully thought out method of performing a function. It does not in any way involve the idea of perfection but simply represents the best method which can be designed at the time the standard is drawn." Note that all agree that a standard is fixed only until a supplanting standard has been discovered that warrants the expense of change.

Check List of Jobs

The objective for each main branch of the work being established and the definition of standards being understood by the participating group, the analysis is continued by listing each activity and job that might contribute to the attainment of the objective. This list can be readily made by segregating the work of each main branch into its major activities and by following each activity through all of its processes. In addition, information available on related subjects in books, conference reports, instructions used by other foresters, and similar sources should be scanned in order to find new ideas which may contribute to the betterment of the technic involved. Thus, the branch of forest management might have as its major activities:

Management plans.
Timber sales.
Planting.
Insect control.
Records.
Research and other development work.

Specimen check list of timber-sale jobs:

Survey.
Appraisal.
Selling campaign.
Contracts and bonds.
Marking boundries.
Sale by tree measurement.
Marking trees.
Woods supervision.
Scaling.
Brush disposal.
Inventory of cut-over area.
Reports.

Continuing with these steps calls for the further breaking up of each of these jobs into such minor component parts or elements as will aid in the analysis.

Developing the Job Specifications

Each element on the Check List of Jobs should now be subjected to a critically analytical determination of: (A) Why; (B) What and Who; (C) How; (D) Where; (E) When; (F) How much (quantity)?

(A) WHY?

This question provides the opportunity to eliminate duplicated and unnecessary work. In the study especially of older established positions, it often results in astonishing savings.

(B) WHAT AND WHO?

The relative weight of the load of a position being analyzed depends in major part on the volume of recurrent work which should be handled *during the peak season* by that position.

Recurrent and Nonrecurrent Work

"Recurrent work" has been properly defined as that which occurs year after year and "nonrecurrent" as that which takes place only sporadically. An example of the former is range inspection. An

example of the latter is the supervision of the building of a dwelling. It is to be emphasized that while specific individual development jobs or studies may not be recurrent, groups of them may combine to make a recurrent activity and from that an annual recurrent set of jobs under that activity. For example, the supervision of construction of a particular trail is not a recurrent job. But if it is planned to have construction crews on one trail or another in the district year after year, then trail-construction work in that unit is recurrent. Again, a particular planting project may not be a recurrent job. But if a forest unit has a certain amount of planting year after year, then planting would be a recurrent job. Land exchanges might likewise form a recurrent job. Numerous other examples could be given.[4]

Cases may also occur in which part of an activity is recurrent and part is nonrecurrent. For example, a certain quantity of timber-sales cutting can be expected from year to year, but in some one year there may be an especially large quantity, due to fire-killed timber or special project demand. Or a district may have a specially large trail program for one year and a smaller yearly quantity of that work as a rule.

Anticipated Jobs

Only such jobs as are reasonably certain to materialize should be considered. An analysis cluttered up with fanciful jobs is of little value. If the month in which they will be done is unknown assign them to the most likely one. Many analyses made during the past allotted time for proposed sales that have not materialized. Moral: Keep contact with the ground in forecasting prospective business.

Foreign Jobs

If it is planned to assign the official temporarily to another field unit or office to do work which is not properly chargeable to his own administrative unit, manifestly such job time should not enter into the work load of his unit, but is needed for the plan. Such jobs should be listed in parts 1, 2, and 3, and the time mentioned but not entered in the time columns.

Commensurate-Caliber Jobs

The specifications should, with the minor exceptions mentioned below, finally *include only that work which is of a caliber commensurate with the caliber of the position being analyzed and should include all of the work of that caliber which should be done on the forest unit being analyzed, regardless of who may do the work and whether or not time and man power are available to accomplish it.* In analyzing a supervisor's job, for example, care should be taken to include all of the work which under good executive management should be done by the supervisor and his assistant supervisor and to exclude work which can and should be done by clerks, guards, scalers, laborers, and others of subsupervisory caliber. Also exclude work which should be done by those in a higher position or by specialists not attached to the local staff. Where these distinctions are not clear the part of the

[4] WOLFF, M. H., A HANDBOOK ON RANGER DISTRICT ANALYSIS AND PLANS. Region 1, U. S. Dept. Agr., Forest Serv. [Mimeographed.]

work which *should* be done should be specifically stated. It may be to plan, or initiate, or inspect, or assist, or actually do the job. That there are alternatives makes it necessary to specify which is used as the basis for analysis.

In the studies of supervisor positions on the national forests, adherence to the foregoing resulted in delegating to the capable ranger force, to the executive assistants, and at times to special crews many tasks which had formerly been done by staff men. Likewise in analyzing ranger positions it was found best to delegate to short-term men much of the actual labor on improvements and similar subranger-caliber work that the ranger had hitherto done. Common-sense exceptions to this provided that the ranger do these jobs during slack periods, if there were any, and handle odds and ends of relatively nontime-consuming, subranger-caliber work at isolated points, provided he could do it at less cost in connection with his other duties, than it would cost if done by a guard or laborer.

Good organization, high productivity, and effective team work are so well served by care in confining the specifications on recurrent jobs to duties belonging to those jobs, that the importance of care in this respect can hardly be overemphasized. Experience has shown that the importance of the proper delegation of work needs more emphasis than it ordinarily receives. Avoiding specifications which contemplate the performace of duties which belong to a position higher in the organization scale is sometimes equally important although often not so readily apparent.

(c) HOW?

As brought out in the discussion of other phases of the analysis, to answer this all-important question properly requires, among other desirable traits, an open mind, analytical ability, a broad knowledge of the subject involved, and all of the intelligence, hard work, and time that can be devoted to it. Plans now being used in handling many classes of forestry work could be improved if studied by research methods. These should be used to the fullest practicable extent in making the analysis. If they can not be utilized, however, tremendous advances can be made by providing for the work to be done, and having it done as well as possible, by methods which have already been developed. This will frequently be the way in which the first analysis of a position must be made. The analysis can then be strengthened piecemeal as data from studies become available.

Determination of "how" frequently involves the technics of job analysis as they have been developed in industrial practice.

(d) WHERE?

Often there is a choice between several places in which to do the work—scale at the mill or in the woods?—take applications at the settlers' houses, in certain towns, or at the headquarters? etc. In some instances it should be concentrated, under other conditions dispersed. Since the job description should be specific, this point should be settled and included in the specifications.

(E) WHEN?

In most localities work "peaks" during some part of the year, usually the summer months. Some of the jobs can not be done at any other time, others may be done during either peak or nonpeak periods. The most skillfully prepared specifications provide for jobs which can be so transposed as to be handled outside the peak season whenever possible. This principle is being followed when, for example, a forest officer prepares for a serious fire season by doing 15 to 30 days of work marking on his timber sales before the opening of the fire season and thereby reduces the pressure on his peak months to this extent.

The question "When?" also brings up the matter of frequency. How often should each mill be visited for scaling purposes? How often should each grazing allotment be inspected? How often should each fireguard be inspected? How often should each report be submitted? These and similar questions should be answered in the job descriptions as finally drafted.

One of the most difficult activities to handle in an analysis and plan is that of training fireguards and establishing them at their points of duty. This is because it is impossible to forecast weather conditions for any length of time and determine the date when the fire season will open and the guards be needed. From year to year, there is as much as two or three weeks' variation, sometimes more, between the opening dates. On forests which employ a large number of guards an unpredictable activity of such great volume and importance is liable to disrupt all of the work to be done at the beginning of the peak season, and to such an extent that the plan of work can not be caught up with for a month or more. Experience has shown, moreover, that after the probable date of the opening of the fire season, heavy winds and hot weather may convert an apparently safe situation into serious fire conditions within a few days. To meet these major difficulties it is now considered best practice to fix the date for the guard training camps early enough, and regardless of possible wet weather, to be sure that this important work is done before the break of fire weather. The guards are then immediately placed and trained at their points of duty. If, then, conditions are still safe, the guards are put on other work from which they can independently reach their stations and, without disrupting the smooth handling of the forest work as a whole, be prepared for action.

(F) HOW MUCH (QUANTITIES)?

As stated in paragraphs (B) and (C), the volume of peak-season work controls to a major extent, the weight of the job load. Accordingly, it is necessary that the determinations of volume quantities be as accurate as possible. Due to the variation by seasons in number of fires, in the volume cut on timber sales, in the amount of money available for improvements, and so on, this is at times a difficult problem to meet. For such activities as are fairly well stabilized the current quantities should be used. For the other lines of work it is often best to use as a forecast of the annual job of the future, the average of the last five years, modified by any clearly foreseeable changes for the next few years. The point to bear in mind here is that the analysis should show the job load as it will very likely be for

the next few years or, if the management wishes to do so, the quantity figures may be a forecast covering a longer period. This would be desirable for use in determining the best location of expensive improvements and for deciding the more final line-up of administrative divisions. However, for use in getting the present work load handled most satisfactorily, an analysis should be made on the basis of the volume of work during the reasonably early future—one to three years. Experience has shown that forecasts are ordinarily too optimistic. For this reason the use, as expressed above, of current figures or past averages usually shows the best results when "actuals" are eventually compared with the estimates.

The total quantity of nonrecurrent jobs in view for the next five years or so should be shown. This is done because some of the programs, such as timber surveys, are often obviously too large to complete in one year, but a proportionate amount of them may be done each year.

The quantity figures shown should be those used in analyzing the job; that is, give the number in each instance, of acres to cruise, logs to scale, trees to mark, crews and guards to supervise, fires by classes to be handled, and other significant details which will bring out the amount of work involved. A job described as "cruise the Big Draw logging chance" means little in terms of quantity unless the acreage is stated and the percentage to be covered by estimate is given.

Other detailed steps which are taken in arriving at the figures used in the analyses and which would unduly burden the job specifications should be retained and included in the appendix.

In the written specifications the quantities should be shown so that the peak-season figures can be easily segregated. This can be done by showing two figures for work which extends beyond the peak period: (1) The peak-season quantity, and (2) the total or "out-peak" figure. In the more complete analyses it is highly preferable to show the amount which will probably be handled each month or on each trip.

UNEXPECTEDS

Work of the unexpected class has wrecked the effectiveness of many analyses and plans. Unusual care should therefore be taken in preparing for it. After being sure that this field of variables is limited to the utmost by consideration of all the available information the best guide for the future is the past average experience to the degree the action taken on previous unexpecteds was satisfactory, and considering whether the trend actually points toward more or less of them. Past records frequently show that as many anticipated jobs do not materialize as there are unexpecteds which arise. One may balance the other. The need to take advantage of this give-and-take in the current work is often overlooked by those who find it difficult to follow plans based on analysis.

LOCAL ANALYSIS

Experience has shown the need for repeating frequently that the analysis in all of its details should be based on the needs of the local and particular situation being studied.

CONSIDERATION OF COSTS

Another point which is of major importance is that at this stage of the analysis, the standards should be such as *will attain the desired objective in quality at minimum costs practically regardless of what those costs may be.* Ordinarily the sense of proportion among the local and particularly among the more objectively minded outside members of the group participating in the study is the only check needed in the application of this principle.

CORRELATION

In organizations composed of several administrative units—forests or districts—doing the same class of work, the standards for each forest should be similar, to the degree the work and conditions affecting the work are similar. Otherwise the results obtained on the separate forests will bear no relation to their relative needs. Note that this does not mean that special conditions on local areas will not be covered by special local standards. The idea of local standards to meet local needs is the keystone of job-load analysis as applied to forest work. The need for correlation, nevertheless, is usually present if more than one unit is involved. Consider, for example, the inaccuracies which would arise from comparing the results obtained on two forests, if one is financed to meet standards which will hold the area burned to 0.1 per cent and an entirely similar forest is expected to meet the same objective, but is financed on the basis of decidedly lower standards.

FORM OF SPECIFICATIONS

Since vagueness is the chief source of confused thinking and analyzing, the job specifications to be of frequent and effective use must be specific, clear, to the point, and brief. They should not, however, be too sketchy. Details of policy, experiments, and other material on which they are based should be segregated in some other place, such as an appendix or handbook, so as not to burden the employee with the necessity for repeatedly searching through long paragraphs to find the operating standards. This is essentially the idea also expressed in the pamphlet, Instructions for Writing Job Specifications, published by the American Council on Education (*1*).

USE OF NORMAL STANDARDS

The process of drafting job standards and specifications is often simplified greatly when policies and throughly tested and applicable standards are already available, as is the case for many forest activities, but not by any means for all of them. *If these will stand the test of constant criticism and analysis* from various angles, they can be briefed and employed in building up the standards used in the analysis of similar positions. Extreme care to see that such standards fit local situations, together with appropriate cross referencing, are essential to good workmanship in analysis. Examples of this class of standards in common use just at present are:

Each ranger district will be given a general inspection by a member of the supervisory force once each year involving * * *.

The ranger will mark all green saw timber that is to be cut on his district * * *.

A member of the supervisory force will go at once to all fires on his forest which may become "extra-period" fires * * *.

LOCAL STANDARDS

In the majority of instances, as stated before, local peculiarities require local standards, in the development of which the best available skill, ingenuity, resourcefulness, and judgment should be used. Thus, in defining the job of training fire guards, consideration should be given to such questions as:

Do all the guards need training and why? Should the guards be trained in small or large groups? Where? When? Who will receive training? How many days of group training in camp will be given each type of guard? Will the trail foremen, road foremen, and others attend the camp? Will any of the laborers attend? How many days should group training be given? What needs to be done to prepare for these camps? Who is to clean up after the camp is over, and who is to do the preparatory work? If it is to be done in part by anyone but the ranger, define that part and state who is to handle it. If it is desired to differentiate between the amount of training at "point of duty" to be given to the primary lookouts, the fire chasers, and the lookout firemen, the new guards, and the old guards, this should be done. The percentage of new men may be reasonably determined by using the turnover figure for the last several years.

Another example, somewhat incomplete but illustrative of the procedure, is found in the following considerations bearing on the job specifications for marking timber:

Can it properly be done in advance during nonpeak periods? If that is not feasible, should it be done at the time of each scaling trip, or at such frequency in connection with scaling trips as to keep a supply of ———— M feet b. m. marked in advance? How about sales by tree measurements so as to have the marking done at the ranger's convenience to eliminate scaling and to give the sale operation more flexibility? In certain types, consider whether it would be good practice to mark the trees which are to be left rather than those which are to be cut. Would it be safe and economical to get assistance from the supervisor's office or from another ranger so as to mark during the off season sufficient timber to carry through for a year?

Throughout this procedure thinking should be done in terms of alternatives. Is there not a better way of doing things? Every established standard and tradition offers a challenge to the effective analyst. It is his duty to question any and all policies. If he is not satisfied with their basis he should record his question and if practicable suggest an improvement; otherwise his apparent acquiescence stamps the existing policies as satisfactory. However, since he does not establish them, he is of course, not responsible for this controlling phase of the analysis program.

JOB-LOAD ANALYSIS MINUS TIME REQUIREMENTS

Part 1, completed as described above, will be a description of how, where, and when each job of commensurate caliber should be done and how much there is of it. To these points will also be added eventually the time requirements for handling each job properly.

The appearance of a job-analysis sheet at this stage is shown in sample.

Form 576w

SAMPLE—JOB-LOAD ANALYSIS, PART I

Forest Management

Composite forest.
Composite ranger district.
Analysis made 1927–28–29 by E. R. M., E. R. O.

Objective: To carry out the provisions of the management plan for the Foothills Working Circle. (Primarily to renovate the stand as a basis for intensive management.)

Major activities and their elements	Perfection and intensity	Local standards of	Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
						Nonfield		Field				Total	
								Job		Travel			
						Days	Hours	Days	Hours	Days	Hours	Days	Hours
Management plan	Has been prepared. No general revision until 1936.												
Growth data	Obtain additional growth data—increment borings and stump counts—on areas specified in the management plan (——— per day) (after Oct. 15).			200	Oct.								
Budget	Check cutting budget semiannually.			2	Jan. Aug.								
Cruising	Obtain data to correct the inventory by cruising an average of 2 sections a year. 20% cruise. (1 crew at ——— acres a day.) Compile notes and enter in record. See also the development section.			640 A. 640 A.	Nov. Feb. Feb.								
Timber sales	Sales to sawmills. There will ordinarily be two small mills operating on the district each cutting an average of 500 M a year.												
Appraisals	Sales will be anticipated in order to make the appraisals out of the peak of the field season. One appraisal usually each year. Made by the ranger with advice and help as needed by the staff.			1 trip.									
	Check field data already available (——— A.=one day) and make report.			500 M.	Feb.								
Cruising	See above under "Cruising." This work is completed.												

	East Foothills compartment (Spring Gulch sale)		
	500 M cut a year D. F. and W. Y. P.		
Marking	To be done principally out of the peak season. Half in the spring. Half in the fall. (——— trees average of 350 feet b. m.= ——— M. per day.) Additional special-order and correction marking will be done while making "Woods supervision" trips.	500 M. 1 trip. 1 trip.	Apr. Nov.
Woods supervision	On each trip to the operation—see "Scaling, etc., for frequency—and at least once per month during the cutting period—visit the sale area and inspect the cutting, brush disposal, etc., done since the previous visit, and make follow-up of previous instructions. 500 M—sale area of 100 A. Average 11 acres cut over per month. Use ——— hour each month in addition to scaling in the woods. (Time studies showed ——— acres=1 hour.)		Apr. May. June. July. Aug. Sept. Oct. Nov. Dec.
Scaling	The contract provides that scaling will be done at intervals of 15 days provided 25 M is available for scaling. This will usually require a scaling trip to be made twice each month, from April to December. Average 50% scaled at mill at ——— per hour. Average 50% scaled in woods at ——— per hour.	500 M=5,000 logs.	Apr. May. June. July. Aug. Sept. Oct. Nov. Dec.

STEP 4. DETERMINING AND RECORDING THE UNIT TIME REQUIREMENTS FOR DOING EACH JOB PROPERLY

General

Since it is most desirable to determine the standards of methods—the job specifications—first, on the basis of how they should be done, almost regardless of time requirements, it is the best practice, at least for the more difficult work, to complete the job specifications before undertaking the time studies. This is an aid to more objective thinking in the establishment of standards. When normal standards are used to any great extent, however, the complete analysis of each job—the job specifications plus the time requirements—may be made before taking the next job up for study. In using either of these methods it is essential to objective thinking to avoid totaling the time set-up before the complete analysis has been made. At this stage let the reasonable needs of the job control, not the available time.

Applicable Methods

In his contribution to a notable symposium on Scientific Management in American Industry, Babcock (*2, p. 78*) says: "The first measure of suitability is of course quality—the performance of the operation so that it results in a predetermined quality of result, for if the predetermined result is not precisely achieved the methods can never be 'best.' The second measure of suitability is avoidance of undue strain upon the operator and equipment, for if these factors do not stand up, the result likewise can never be achieved. These two criteria having been met, then the measure by which the best remaining combinations of variables of conditions and method are determined is the shortness of the time of performing the operation."

Degree of Accuracy

Taylor who believed that the basic philosophy back of time studies was to find out how long a job should take, repeatedly emphasized that tasks should be set only as the result of scientific investigation. On the other hand a more recent writer on the subject (*15, p. 15*) has stated: "Factors inherent in a given situation make it necessary to depart from a theoretically ideal procedure and do what is practically possible." In similar vein Frederick explains that it is unnecessary to be too exact or to spend too much to seek absolute accuracy and that the engineer intuitively uses a margin of safety or factor of possible error with his calculations.

Obviously this last-described policy must be followed with extreme care or the results will not be defensible. The "it will kill a day" attitude spoiled many of the earlier analyses. This statement by Frederick, however, supports the method which has been found to be most practicable for use in determining the time needs of many of the lines of work with which the forest manager deals. In brief, this method calls for obtaining and using the most accurate data which conditions governing the study will permit. This to be followed by additional studies which will gradually make more accurate data available. The same idea is expressed by Babcock (*2, p. 83*) in the statement: "But after such general standardization has been effected by one who is expert * * * and has a strong sense of arrangement and order, time study of the complicated operation * * * will disclose opportunities for a greater degree of refinement in organ-

ization of the operation. This refinement of the operation itself is a by-product of time study; its major objectives are to give planning and control data by determining the time factor for each operation; * * * time and method information for the guidance of the worker; * * * unit times for predetermination of the costs of changes * * *. Time study * * * does not give * * * a cheap substitute for one having skill * * * and a genius for order and economy.

Who Should Make the Time Studies?

The question who shall make the time studies as applied to the work of a forest manager is appropriately answered by Babcock, who quotes Barth, and says (*2, p. 83*): "It is a common misconception that time study is a necessary or good means to discover useless or wasteful motions preliminary to standardizing a complex operation. 'Such motions are best ferreted out by common-sense observations on the part of a person well versed in the trade, who has caught the right spirit, without any time study. The time study properly comes later, and may then be made by a person less expert in the trade; but no amount of mere time study of an unstandardized complex operation will directly lead to the elimination of its useless or wasteful motions. * * * Because of the misconception referred to, a lot of worthless time study is being made the country over by mere stop-watch men. Time study should not be taken up until conditions of * * * [equipment], materials, and motions have all been properly studied in an everyday, common-sense, and expert manner, and later standardized on the strength of the information thus gained.'"

Participation in the studies by those who are to use the results is very desirable but, as stated in the suggestions for determining the job specifications, an "outsider" with his more objective point of view should direct or at least participate in them.

Average or First-Class Man?

As applied to industrial work, Babcock (*2, p. 86–87*) states: "* * * There is no disagreement between competent technicians on the proposition * * * that the time allowances for doing a piece of work should not be based on those of an average man. Yet not a few writers, unacquainted with time study but appraising it as a social institution, argue that an average man should be selected as more properly representative of a group. However, experience has demonstrated that selection of the average man leads eventually not only to a practical nullification of any constructive results, but frequently to confusion and disaster. This is because times based on an average man, as so rated at the beginning of betterment of conditions and methods, are likely to represent the abilities of low-grade skill after betterment is completed; or put in another way, time standards based on the study of men rated highest at the beginning of betterment are almost certain to correspond to the competence of average men after betterment is completed."

What type of man then should be used? The answer by Merrick (*22, p. 5*), as summarized for his profession, is that he—"* * * should be advisedly a first-class worker, skilled in the line of activity under investigation and of somewhat better than average ability

* * *." "The acceptance of this viewpoint places upon management a definite responsibility *for so selecting, training, and assisting the workers that all those assigned to a given kind of work will be 'first-class' operators or may properly be expected in due time to become 'first class.'* * * * it may be stated as an axiom that for every individual there is some work in which he or she could rank as first class, and in practice there is ordinarily no great difficulty in bringing about a satisfactory reassignment of those who have been misplaced" (*12, p. 220*). The aim as expressed by Taylor should be to determine the pace under which men become happier and thrive. Having determined the pace "* * * of a first-class man, it is a simple matter to determine the percentage which an average man will fall short of this maximum" (*30, p. 168*).

The suggestion that the foregoing principle may be applicable to the work of a field-going forest executive at first often arouses vigorous protests. Reconsideration of the full import of the policy finds in it little if anything which a progressive management is not already striving to put into effect.

Although the "first-class man" idea has been recognized, no particular effort, other than the normal one of selecting high-grade men to work with in developing a new method, has been made so far to use it in the studies here discussed. Results have been astonishingly good through working with a group and observing and accepting, as modified by agreement, the time requirements of whomsoever may be occupying the position being analyzed. As explained below, the "agreement" has resulted in using nothing more than average to high-average figures with the understanding that if they were surpassed in actual use, the time so made available could be used for additional "development" work with credit given accordingly.

To use any other method was not deemed necessary or desirable at this stage in the development of attitudes and methods, although it is contrary to the statement of Hathaway (*12, p. 222*) that— "* * * I should consider figures arrived at as a result of studies of work * * * ranging from the fastest to the slowest, as not being worth the time and trouble taken to accumulate them."

The Criterion of Past Performance

Past action is often found to be of little value as an indicator of what should be done. This extremely important point is also frequently repeated in the literature on scientific management. This is particularly true in forest administration. For example, if an official has been employed to handle the work on a 250,000-acre unit which has little other business than that connected with fire protection, possibly 150 days a year of his time would be shown as devoted to this one activity. With the coming of timber sales, and the handling of them absorbed by merely diverting time from fire-control work, then his "past actual" time would show possibly only 75 days on fire control. There would have been no change in the volume of fire work, but the occurrence of something else to do would have reduced his previous past actual time figures by half.

It will also be clear that if a forest officer has been riding a hobby and devoting more time to some particular activity than the needs of that activity required, or if, for example, he has been failing to inspect his timber-sale operations sufficiently and consequently has

not been charging much time to this work, then his "past actuals" are poor criteria of the time actually needed to handle his work properly.

These very raw illustrations are applicable in varying degrees whenever the past-performance figures are considered for possible use in plans for the future. Sometimes they are applicable, but even such figures should be reanalyzed to determine whether they meet the controlling principle, that of providing the proper time for doing work as it should be done rather than as it has been done.

Fatigue

To many who are confined to one line of work, the forest executive's position with its variety of duties and its field trips alternating with time in the office, seems ideal so far as its effect on health is concerned.

The appearance of those who have occupied these positions for some time justifies this assumption to a decidedly mixed extent. In the first place, the popular idea of the work is liable to overlook the mental tension concurrent with the long difficult fire seasons in some localities. Nor is the executive always able to free himself of his work with the close of the day. This is due not only to the difficulty of the routine work but primarily to the unplumbed possibilities of his forest and to the lack of adequate personal restraint in efforts to develop it. In other words, it is often not the reasonable demands of the position but the personal drive of the executive occupying the position that leads to excessive strain.

No direct control over the extremely important personal-drive factor has been attempted in these studies, other than advocating adherence to a properly made plan of work with its temperate provisions. This limits the consideration of fatigue to the demands of the work itself. In this connection Munsterburg, as quoted by Vernon (*33, p. 82*), states that "the problem of monotony comes very near to the question of fatigue." Vernon (*33, p. 83*) has also quoted Munsterburg as believing "that the feeling of monotony depends much less upon the particular kind of work performed than upon the disposition of the individual performing it." He found many who were doing repetitive work and enjoying it because of their freedom to turn to other matters. He also found workers who seemed to have really interesting and varied activities who complained bitterly of their monotonous labor. The same was observed in intellectual work.

There is considerable literature on the subject of fatigue, but research in regard to it does not seem to have gone far enough to develop results which can be used directly in the study of executive work. In the meantine, therefore, bearing in mind that the forest executive's duties are both physical and mental, experience and judgment and the opinions of the authorities should enter into the use of unit time-study figures. Fatigue according to Hathaway (*12, p. 238*) " * * * is compensated for by the inherently diversified nature of suboperations or by periods of inactivity * * *." Possible examples are the changes in classes of work between concentrated mental effort in the office, the physical job of marking timber, and the relative mental inactivity required while traveling between jobs.

It has also been quite definitely shown that on consecutive jobs requiring concentration, periods of relaxation should be provided at intervals depending on the nature of the work. Vernon (*33, p. 250*) as a result of his studies states:

"Up to a certain point fatigue is a natural physiological condition, which is inevitably incurred as the result of industrial work, and it does good rather than harm to the worker. Beyond this point it becomes pathological and acts injuriously upon him, but the pathological condition arises so gradually out of the physiological, and the evil effects produced at first may be so slight, that it is quite impossible to put a figure on the line of demarcation. Often one can judge only by the cumulative effects of the over-fatigue, which may take weeks, months, or even years, to reveal themselves beyond question, and then it may be too late to effect a remedy. Hence the employer who wishes to avoid all industrial conditions which injure the health of his employees, and the investigators * * * often have to act * * * on general principles. They may not be able to adduce specific reasons which can be substantiated by direct appeal to the industry or occupation under consideration. For technical reasons it may be almost impossible at any time to secure the evidence desired, or it may take years to accumulate it. But this is no reason for postponing action. Let the conditions suggested by a study of other industries be adopted. * * * every substantial change in industrial conditions ought to be regarded as an experiment, the effects of which should be carefully ascertained," Vernon (*33, p. 48*) also says " * * * a great deal of energy is expended if a man stands idly all day * * * without doing any work whatever. The effects of noise * * * of inefficient ventilation * * * would account for a good many of the units of energy, * * * the shorter the hours worked the greater the amount of energy available for productive work * * *. Hence the total output would increase more and more as the hours of work were shortened, were it not for another factor which is acting in the opposite direction. * * * The greater the speed * * * the relatively greater the call upon the physical energies of the body."

It is unfortunate that the apparent lack of data regarding fatigue as it affects executives makes it necessary to quote material which is based so extensively on shop practice. The values, however, that might be gained through analogy and the direct application of these theories to duties of the forest executive, seem to justify making them available even in this inadequate form. Undoubtedly the question of fatigue calls for consideration of all existing data on the subject and especially for further studies which will give greater attention to this problem as it affects the executive. The very men whom the profession must depend upon for the bulk of its creative advances are most in need of thinking, studies, and habits which will cultivate the rule of moderation and which will encourage working habits which will not tear men's physical or mental constitutions to pieces.

Other Allowances

In order to conform with the best practices in job-load studies, provision should be made, so far as their needs can be determined, not only for rest periods to offset fatigue, but also for the lag between jobs, reflection, and other intangibles.

The analyses of supervisory work discussed here have not been so close as to justify the inclusion of all these factors as separate items. The method used has been to determine as accurately as possible the time needs for each job by having it done several times in order to obtain the average and then either to accept this basis of fact or to liberalize the figures thus obtained by adding an allowance, depending on the class of the work involved. It is appreciated that this may be very "unscientific" but, as stated before, considering the caliber of the positions being analyzed, the stage of development and use of the studies, and the results obtained, this was felt to be the best approach.

Carelessness in the use of allowances will nevertheless lead to an entirely erroneous weighing of a position. This is especially true in analyzing minor to insignificant jobs, since the analyst in dealing with the small figures involved may, with a care-free gesture, say "these are incidentals" and provide no time, or, in avoiding an appearance of personal smallness, be so liberal that the time provisions will exceed by possibly 100 per cent the actual requirements. And, since there may be listed a tremendous number of these subjobs, the deficiencies or excess allowances *in the aggregate will spoil the value of the analysis*. The only way to avoid this error is to make time studies of these tasks, to record the actual results in the body of the analysis, and in making additional allowances to make them with the "actual" figures in mind.

LAG BETWEEN JOBS

The lag between jobs is the lapse of time between thinking and putting the thought into action (*13*). An important distinction pointed out by Taylor is that this figure should be relatively large on jobs made up of a large number of different elements *infrequently repeated*. This factor grows smaller as the work is more frequently done. A reasonably satisfactory and accurate method for determining this allowance is to compare the time for doing a larger task, as built up from the unit time of each of the elements comprising the task, with the time actually taken to do the whole task; the difference being the unanticipated "lag." To cover this, a percentage must be added to the sum of the unit times.

REFLECTION

It is an accepted and sound theory that the time needed by a forest executive for reflection should increase in direct ratio with the degree of responsibility he has in developing a property to its fullest practicable extent. The stages through which this development should go are expressed in the objectives for each activity. In determining the time needs therefore for each piece of work, adequate provision should be made for reflection. This means that routine work should be treated with greater regard to the time studies than should be the case with uncommon problems and new ideas. Each of these as brought up for consideration and analysis ordinarily may be subdivided into tangible jobs with their time requirements arrived at in the usual manner, and such additional time provided as the relative value and need of the probable outcome may dictate. In any event the basis or reason for the time allowance should be clearly

stated. It may be to study statistics and draw conclusions; to read books on related subjects in search for new ideas, or simply time for reflection. Only in this way will the figures always be under consideration as to their adequacy and the executive assured of providing time for such things.

This procedure may seem to slight the need for that silent contemplation which many feel to be invaluable for the birth of new ideas and the development of older ones. On the contrary, it is intended that it shall recognize this theory to the extent that the management wishes it to be recognized, and shall also admit the theory that some of the very best creative thinking is not done as a result of sitting down at a desk with the intent to think, but as the result of the stimulus to the intellectual powers resulting from the actual doing of tangible jobs and planned experiments or from contacts with other minds. It also appreciates that the hours required to travel from job to job provide time which often has been and will continue to be devoted to meditation.

MECHANICS OF THE TIME RECORD

For work that is to be done during more than one month, the times should be indicated separately for each of the months concerned. And, if the jobs are to be done more than once a month, the unit time should be kept segregated. Also, for the reasons outlined under *Quantities* the times for the months which may be partly in the peak season and partly out of it should be split so as to facilitate determination of the peak-season load. The basis for the time allowances should also be shown in the job descriptions. This provides something to study for future revisions. If the analysis is based on scaling, say 50 logs per hour at 10 logs per M feet b. m. state that in parentheses in the job description. So, too, with guard inspection (——— hours job time each inspection); cruising (——— miles per day of strip ——— chains wide equals ——— acres and ——— M feet b. m. per day) and so on. This does not mean that necessarily these exact figures will be met when the plan is being followed, but it is the process that must be applied in good analyzing and is in the class of well-thought-out basic data which should not be lost.

Time entries of less than an hour should be kept as notes in the body of the job specifications, only rounded-off hours being shown in the time columns. Where the number of hours exceed the number established as a work day they should be converted into days with the fractional parts of the days expressed in hours. Decimals in the sample analyses indicate hours. If the position calls for an 8-hour day, for example, the figure 3.6 means three 8-hour days, plus six hours. If the number of hours of work per day required of any position changes, the analysis and the job-load weight as expressed in days should, of course, be changed accordingly.

There are some small jobs which require so little time, 5 to 10 minutes, that no time may be set up for them. They are needed for a complete work plan, however, and should be entered as any other job but minus a time allotment. On field trips such jobs as preparing sign requisitions, noting map corrections, posting ration lists, etc., are within this class and their time requirements may be shown as "incidental" and the time for them shown as (x).

There may be another type of job which in the aggregate is a time consumer but to accomplish one unit of which requires but a fraction of an hour. For instance, the checking of tool caches, for which 15 minutes may be correct. The total time for checking all caches should appear in part 1, the time for each month in part 2, and this in turn should be carried forward to part 3 and prorated to the trips affected.

Time requirements should be divided between (1) nonfield office, (2) travel, and (3) field job. These are often abbreviated to "office," "travel," and "job." "Nonfield," as used in the sample analyses, includes the time for all jobs done at the headquarters, whether office, yard, headquarter improvements, or any other work at this point.

Actually accompanying the forester in the performance of his work, and timing him *while he is doing it the way it should be done*, is the method that should be used whenever it is practicable to do so, and it usually is. This procedure is not only scientifically correct but saves many hours of less productive discussion. Inspecting timber-sale operations, making appraisals, handling visitors and routine correspondence, inspecting fireguards and improvement crews, inspecting ranger districts, grazing allotments, and recreation areas—these and other jobs throughout the list of activities in which the forester is engaged are all susceptible to this form of study.

Lacking the time to follow through the actual motions for field jobs, the next-best method for studying their time requirements is to show their location on a map, as outlined on page 15. The sawmills here, the fireguards there, the grazing allotments in this section, and improvement crews in this and that place, waste range in brown, lambing grounds crosshatched, early spring cattle and horse units in pink, and so on. Unit time studies having been made elsewhere of the time needed to do the work attached to each activity, the additional time needed for travel may then be determined by scaling the routes of travel and applying to the mileage thus determined the average speed for the form of locomotion that should be used.

TRAVEL TIME

For some positions which have been analyzed travel has been found to be as high as 50 per cent of the total time requirements. It frequently averages 25 per cent. It is therefore important that it be studied with care.

First Method

The most easily understood way of handling travel time is to analyze it through as one step in the analysis of each job. For example, the inspection of a small timber sale may involve zero nonfield time, plus 2 hours job, plus 2 hours travel; the travel consisting of 1 hour out from headquarters and 1 hour back. Such estimates of travel time may have to be revised later if it is found, in part 3 of the study, that the job will be done in connection with other work instead of requiring a special trip for it alone and a return at once to headquarters. Although this revision may later take place, the travel time should nevertheless be determined as accurately as possible at this stage in order to facilitate the preparation of part 2. If revised later, the original figures should be recorded in the appendix.

Second Method

Since many jobs obviously should not be handled on separate in-and-out trips from headquarters, the travel time for them should be tied in with the longer trips which will be determined in part 3. If this method is followed the travel-time entries are omitted until part 3 is completed. This is a very satisfactory method, although it weakens one of the early uses of part 2, that of showing how the jobs need to be adjusted between months before part 3 is started.

Third Method

Another satisfactory procedure is a combination of the two methods described above. For jobs which clearly will be handled on special trips the travel time is entered at once as outlined for the first method. In the travel column for jobs which do not warrant special trips and will be handled only incidentally to other work, so far as travel is concerned, an appropriate symbol (an x has been used in the attached sample analyses) is placed; thus showing it has been considered. Experience has shown that this "incidental" feature may be overdone. While the job time is being determined for other field work, the trip on which it will probably be done is visualized, and that portion of the travel time directly chargeable to each job is the figure which should be used as its travel time. For example, if the job of inspecting a trail-construction crew is being studied, the analyst may consider it as being done at the time each trip is made on guard inspection, and that the crew will be at work at a distance requiring one hour of round-trip travel from the direct route to the guards. The travel time for each inspection of this trail crew will then be one hour. If, in addition, on these guard-inspection trips marking is to be done on some sale area which requires two hours of extra travel from the direct trail to the guard stations, then in the same manner two hours will be the travel time for each trip for marking. When the analysis of the guard-inspection job is reached the travel time for each series of inspections will be that needed for the direct travel from headquarters to each of the guard stations in sequence and back to the headquarters.

The figures arrived at by this third method will be very close to the final figures, although some of them will still need revision when the trips in part 3 have been completely outlined. The final checking as discussed in connection with part 3 is facilitated by use of some such form as that shown on page 44. Data on this form should be retained in the appendix.

The charging of only the extra side-trip travel to some jobs, regardless of their importance, and debiting the main portion of the travel time to one activity, as is done by charging it to guard inspection in the foregoing example, is not exact cost accounting. If this is desired the total travel time for a trip may be prorated against the various jobs connected with it, on the basis of the proportionate amount of "job" time required for each piece of work which is done. The form shown on page 44 may be used as an aid to making this distribution.

Fourth Method

In regions where extended trips are impracticable and the location of work changes greatly from month to month, travel time becomes a very uncertain feature. In such instances it is sometimes necessary to substitute for analyzed travel time a percentage or average allowance which should be based on the analysis of a number of theoretical or actual sequences. This method, which has been used in computing the index weight of job loads [5] and has been further developed by Scott,[6] is a useful though "last resort" method.

Revision of Time Set-ups

This is deemed a good place to point out that as part 2 is developed, and as the process moves on to making the plan in part 3, there will very likely be need (in almost all instances) to go back and correct travel times previously set up, and in some cases the set-up for the "best month to do the job in." This will result from several possible sources: (1) As will be discussed more comprehensively in its proper place, a balancing by months in part 2 will result in moving certain itemized jobs from one month to another, and hence a regrouping of jobs and their necessary travel. (2) If some of the jobs have to be handled by an assistant, some increase of travel and nonfield may result. (3) The final preparation of part 3 will undoubtedly indicate some travel-time changes. All this makes it desirable to preserve any rough notes made while the preparation progresses, to enable ready check back as need arises. (For suggested form of rough notes see p. 44).

A sample sheet of the job-load analysis at this stage is shown.

A more accurate method for use in obtaining time figures than that generally used in these studies is shown on pages 216 to 227.

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[5] Loveridge, E. W. computed index weighTs of ranger district job loads. U. S. Dept. Agr. Forest Serv. 1930. (Unpublished.)

[6] Scott, J. E. analysis of the white mountain national forest supervisory and ranger district work. U. S. Dept. Agr., Forest Serv. 1930. (Unpublished.)

SAMPLE—JOB-LOAD ANALYSIS, PART 1

Forest Management

Composite forest.
Composite ranger district.
Analysis made 1927–28–29 by E. R. M., E. R. O.

Objective: To carry out the provisions of the management plan for the Foothills Working Circle. (Primarily to renovate the stand as a basis for intensive management.)

Major activities and their elements	Local standards of Perfection and intensity	Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
					Nonfield		Field				Total	
							Job		Travel			
					Days	Hours	Days	Hours	Days	Hours	Days	Hours
Management plan	Has been prepared. No general revision until 1936.											
Growth data	Obtain additional growth data, increment borings and stump counts, on areas specified in the management plan (80 per day). (After Oct. 15.)		200	Oct.	1	0	2	4			3	4
Budget	Check cutting budget semiannually.		2	Jan. Aug.		2						2
Cruising	Obtain data to correct the inventory by cruising an average of 2 sections a year. 20% cruise.		640 A	Nov.		1	4	0		2	4	3
	(1 crew at 160 A. a day.)		640 A	Feb.		1	4	0		2	4	3
	Compile notes and enter in record. See also the development section.			Feb.	2	0					2	0
Timber sales	Sales to sawmills. There will ordinarily be two small mills operating on the district each cutting an average of 500 M a year.											
Appraisals	Sales will be anticipated in order to make the appraisals out of the peak of the field season. One appraisal usually each year. Made by the ranger with advice and help as needed by the staff.		1 trip.									
	Check field data already available (100 A.=one day) and make report.		500 M	Feb.	1	4	1	0		2	2	6
Cruising	See above under "Plan cruising." This work is completed.											
	East Foothills compartment (Spring Gulch Sale)											
	500 M cut a year D. F. and W. Y. P.											

Marking	To be done principally out of the peak season. Half in the spring. Half in the fall. (350 trees average of 350 feet b. m.=120 M per day.) Additional special-order and correction marking will be done while making "Woods supervision" trips.	500 M. 1 trip. 1 trip.	Apr. Nov.			2 2	1 1 x		2 2 x	2 2	3 3
Woods supervision	On each trip to the operation—see "Scaling", etc., for frequency—and at least once per month during the cutting period visit the sale area and inspect the cutting, brush disposal, etc., done since the previous visit, and make follow-up of previous inspections. (500 M feet=sale area of 100 A.) Average 11 A. cut over per month. Use 1 hour each month in addition to scaling in the woods. (Time studies showed 80 A.=1 hour.		Apr. May. June. July. Aug. Sept. Oct. Nov. Dec.				1 1 1 1 1 1 1 1 1		x x x x x x x x x		1 1 1 1 1 1 1 1 1
Scaling	The contract provides that scaling will be done at intervals of 15 days provided 25 M is available for scaling. This will usually require a scaling trip to be made twice each month, from April to December. Average 50% scaled at mill at 60 per hour. Average 50% scaled in woods at 30 per hour.	500 M=5,000 logs	Apr. May. June. July. Aug. Sept. Oct. Nov. Dec.			1 1 1 1 1 1 1 1 1	5 5 5 5 5 5 5 5 5		4 4 4 4 2 2 4 4 4	2 2 2 2 1 1 2 2 2	1 1 1 1 7 7 1 1 1

PART 2. THE JOB LIST

STEP 5. GROUPING THE SEPARATE JOBS INTO THE PERIODS DURING WHICH THEY SHOULD BE DONE

Part 1 when finished includes a statement of itemized jobs, quantities, and best months in which to do the work. In addition it shows time set-ups divided between nonfield (office), job (field), travel. If part 1 is thoroughly made, part 2 is relatively easy to complete.

On the job-list forms, similar to the sample shown on page 39, should be listed by months a summarized brief statement of each of the items of work described in part 1. The nonrecurrent work should be segregated from the recurrent jobs below the heavy line in the block for each month.

After all the jobs have been transferred from part 1 to part 2 the total time allotted to each month should be balanced. Two steps are necessary: (1) Eliminate duplicate travel time by grouping the jobs together tentatively by trips and showing for each trip only the net travel time. This is explained in greater detail on pages 41 and 42. All jobs to be done on the same trip should be given the same trip number in the column provided for that purpose. (2) If the total time allotted to any month is in excess of the time available in that month, an attempt should be made to transfer jobs from the overloaded month to others less heavily loaded. Of course, jobs should not be moved from one month to another if the work suffers seriously thereby. Any one transfer may result in a succession of transfers between months to attain a balance. Any part of the overload which can not be moved to another month should be allowed to stand as indicated.

Nonrecurrent jobs when set up should, so far as possible, be distributed among the lightest months of recurrent work.

One-fifth of the gross quantity of nonrecurrent work expected to be done during the next five years may be an index of the amount to be figured on as the load for the ensuing year, but not necessarily, for if the work could reasonably be done in some other length of time, the divisor should be changed correspondingly. The nonrecurrent job set-ups in part 2 being for one year will, of course, not check with the nonrecurrent set-ups in part 1, if they are to be spread over five or some other number of years.

If, after all adjustments possible are made, some months are still overloaded with essential work which will probably continue the indication is that part of the unit may have to be consolidated with an adjacent one, or an assistant provided.

Whenever this is done, of course, changes result in the set-ups in part 1. In the one case quantities would be decreased; in the second case, if an assistant is provided, the forester's time actually spent on some of the jobs may have to be changed to supervision of his assistant on those jobs.

The final determination of the overload can not be made until closer figures as to what the forester in question can handle have been worked out in part 3.

Besides serving to balance months' loads, and to check and supplement the major part of the job analysis in part 1, part 2 is in a measure a go-between from the analysis to the plan. As will later be noted, *part 2, when completed, will show the analyzed work grouped by months, i. e., the job-load weight of the unit.* This is the part of the

Form 577

NATIONAL FOREST .....

ADMINISTRATIVE UNIT .....

DATE PLAN WAS MADE ..... BY WHOM .....

JOB SHEET—Continued

The items below the lines ruled in black are nonrecurrent or development jobs:

8—6933

TRIP NUMBER	JOB	TIME: NON-FIELD	TIME: FIELD Job	TIME: FIELD Travel	TIME: TOTAL
	MAY				
	M. P. O. Equipment,				
	Form 26 and Miscellaneous Office,				
	TOTAL RECURRENT,				
	TOTAL NONRECURRENT OR DEVELOPMENT,				
	GRAND TOTALS,				
	AUGUST				

TRIP NUMBER	JOB	NON-FIELD
	JUNE	
	M. P. O. Equipment,	
	Form 26 and Miscellaneous Office,	
	TOTAL RECURRENT,	
	TOTAL NONRECURRENT OR DEVELOPMENT,	
	GRAND TOTALS,	
	SEPTEMBER	

analysis and plan that gives the most comprehensive picture of the job as a whole and therefore lends itself best to juggling jobs and manipulating time set-ups in the best interests of administration.

Part 2 will also show the planned recurrent work and nonrecurrent jobs for the ensuing 12 month period. If there is no overload in the unit, then the analyzed recurrent work to be done and the planned recurrent work for the ensuing period will be identical. Where there

F.S. - Forest Supervisor
F.C. - Fire Chief
I.R. - Improvement Ranger
F.E. - Forest Examiner
G.R. - Grazing Ranger

The items below the lines ruled in black are nonrecurrent or development jobs:

JOB SHEET—Continued

Part 2

TRIP NUMBER	MAY JOB	TIME Non-field	Field Job	Field Travel	Total
F.S.	Inspection roads		2	2	4
"	Training new ranger		2 4		2 4
"	Follow-up R.D. plans	3			3
"	Miscellaneous correspondence (All staff 2.2)	2 4			2 4
"	Visiting officers		1		1
"	Callers	2			2
"	Telephone calls	1			1
"	California Development Association meeting	2	6	6	1 6
"	County board meetings	1	2	4	7
"	Interview Stats ranger (F.C. also)	1			1
"	Newspaper article	2			2
"	Sportsmans association meeting		3	4	7
"	Miscellaneous talks and contacts	2			2 2
"	S. Trouble shooting		1		1
"	Small sales inspection #				
"	G range inspection #				
"	Uses inspection #				
"	Camp-ground inspection #				
"	Conference re water power		1 2		1 2
"	Indian affairs	2			2
		6 2	9 3	2	17 5
F.C.	Scheduling and training Prev. Cr.		1		1
"	Dispatching	4			4
"	F.F.		1		1
"	Supervising construction fire breaks		1	1	2
"	Guard hire	4		6	1 2
		8	3 6	1	5 6
I.R.	Road location		4		4
"	Starting road crews	4			4
		4	4		8
F.E.	Project sale inspection and visitors		1	4	1 4
"	Visiting officers		2		2
"	Small sale appraisals	2	2		4
F.E.	Project sale inspection (& visitors)		2	1	3
"	Marking supervision		1		1
"	Check scaling			6	1 2
"	Scaler training		1		1
"	Land exchange	2	1		3 4
		4	11	2 2	17 2
G.R.	Attend Jackson Range Association meeting		3	2	

M. P. O. Equipment,
Form 26 and Miscellaneous Office,
TOTAL RECURRENT,

	15	28

TOTAL NONRECURRENT OR DEVELOPMENT,
GRAND TOTALS,

TRIP NUMBER	JUNE JOB	TIME Non-field	Field Job	Field Travel	Total
F.S.	Law enforcement		2		
"	Guard training camp			2	
"	Guard inspection				
"	Inspection roads			2	
"	Training new ranger		2	4	
"	General R.D. inspection		3	7 4	
"	Follow-up R.D. plans		3		
"	Miscellaneous correspondence (All staff 1.4)	2	1		
"	Horse and equipment		1		
"	Visiting officers				
"	Callers				
"	Telephone calls	1			
"	California Development Association meeting				
"	Show-me trip				
"	Miscellaneous talks and contacts				
"	Project sale inspection				
"	Small sale inspection #				
"	S trouble shooting				
"	G Range inspection #				
"	G trouble shooting				
"	Special use cases				
"	Uses inspection #				
"	Recreational association				
"	Camp-ground inspection				
"	Investigate doubtful				
"	Conference re water				
"	Indian affairs				
"	Land exchange				
F.C.	Law enforcement				
"	Guard train				
"	Guard, sal				
"	Dispatchi				
"	Sitting				
"	F.F.				
"	" "				
"	Ins				
"	Gv				
"					
I.R.					
"					
"					

is an overload they will not be the same. In other words, there will be two sets of figures for the recurrent work—the time that ought to be spent on it and the time that is planned to be spent during the ensuing period.

This dual use of the job-list form for overloaded forest units may in some cases suggest that two copies of the form be used, one fulfilling its function as a completion of the job analyses—showing the analyzed estimated complete job load, annually, of the work, and the second copy showing grouped by months the jobs planned for the ensuing 12-months, both recurrent and nonrecurrent.

If only one form part 2 is used, the segregation between analyzed set-ups and planned set-ups for ensuing periods may be accomplished by blocking out lightly in red the time needs for those jobs which can be performed in full by the forester in charge or can be done by him only in part. When a part of a job is to be done, the fraction of time

necessary to do it may be inserted lightly in red over the total time set-up (separately for office, job, travel, and total) for each such job. There will result two totals for each month—one, the total time set up to perform the recurrent work which should be done, and the other, in red, the work which will be done in the ensuing period.

As will also later be noted, when the job analysis and plan have been fully completed, the total time set-ups of recurrent work in part 1 should check within a stated margin of error, with the total time set-ups in part 2 for the recurrent work which should be done. Also, the total time set-ups by months in part 2 for the recurrent work, plus the nonrecurrent jobs, both as planned for the ensuing period and not lined out, should check with the total time set-ups by months in part 3, the schedules. On forest units that are not overloaded, the recurrent work in parts 1, 2, and 3 will balance.

Part 2 as a Complete Job List—New and Other Unanticipated Jobs

Unanticipated jobs are inevitable in the best of analyses and plans, and some will have to be fitted into the scheduled plan period. When such jobs arise they should be added currently in part 2 to the proper month. Where this is done in midseason it is unecessary to make a corresponding entry on part 1, and a mere notation of the job under the proper trip is sufficient on part 3. Similarly an abandoned job should be stricken off parts 2 and 3. Part 2 will then show all of the jobs whether or not originally included in the analysis. Another advantage in making these additions is that in the first analysis some jobs may have been overlooked and, if so, part 2 should be of assistance in preparing future ones.

Assigning Jobs

If the work should be divided between two or more officials, the assignment for each job should be shown in part 2. The best method seems to be to group the jobs by the individuals to whom they are assigned. Usually all of these groups can be shown one beneath the other in the single space provided for each month.

PART 3. THE PLAN

STEP 6. REASSEMBLING THE SEPARATE JOBS IN AN INTEGRATED PLAN OF ACTION—SCHEDULING, PLANNING, AND ROUTING, INCLUDING TRIP PLANS

In the preparation of parts 1 and 2 much of the data for part 3 will already have been worked up. (P. 44.) From these notes which should have been kept, much of the material for part 3 is available. Whether it is or not, it will be recalled that in the instructions for part 2 it was stated that each job, for each month on the job list, should be given a trip number in the column headed "Trip number." All the jobs which can be done on one trip may be marked as trip 1, all those jobs which can be done on another trip may be marked as trip 2, and so on. This is a relatively simple process to one who knows the country and the location of the work. Those jobs which will be done on several trips should have the several trip numbers on the same line with them. Thus, "guards inspection, east side" may be the main object for trip 1. Other jobs which will also be done on this trip, and which should also be marked as trip 1, may be inspecting special uses, Jones cutting, Smith range, etc. Trip 2 may be based principally on "inspection Falls range." On this trip special uses may again be

inspected; hence, in the column opposite "special uses" will be shown a figure 1, as well as a 2, and so on for all the jobs in each month.

With the jobs thus assigned to trips there is no great difficulty in writing up the trips in a logical sequence of "progressive travel." This calls for following through on each trip by visualizing the whole story, and recording it with travel time and job time segregated for each job to be done on the trip. The trip descriptions should be in sufficient detail and clear enough so that the one who is to use them gets the greatest possible help from them, and especially so that a new man taking over the forest unit may have available the benefit of accumulated knowledge as to the best way for taking each group-job trip. It probably should be added here that although the plan may specify a definite line of travel, it is not anticipated that this particular line will actually be followed in every instance, but that the general routing indicated by it will be a guide. Also, although the time for each job on each trip should be shown, it is recognized that in the give-and-take of time usage between jobs on a trip rests the probabilities for completing the trip as a whole within the predicted time.

Assignment of Jobs

If a job from part 1 is to be done by any one, other than the official in charge of the administrative unit, the person to whom it is assigned should be shown in the columns provided for this purpose in part 3. Do not assign jobs done by others than the regular supervisory force or by hired scalers. Later, individual plans should be prepared for these assistants, but until this is done their plans, in so far as commensurate caliber jobs are concerned, will be included in the part 3 plan. (By disregarding the subcaliber jobs done by these assistants, it is not expected that part 3 will always cover their full time.)

Special Trips

At the end of each month special trips should be listed separately. These cover jobs the date of which can not be predicted or logically planned. For example: Fire suppression or a job dependent upon an outside agency over which we have no control, as the distribution of fish.

There should also be brought forward to the form (part 3) the nonfield work for the month as shown in part 2. The totals of the times for the month on part 3 will then check within a specified limit of error with the "clear" totals (not lined out) of part 2. The trip numbers should also be identical.

For analysis purposes, part 3 is not needed for those months for which the job list is composed primarily of nonfield work; for example, the winter season in some places. Part 2 for these months will serve as the plan of work, with a copy of part 2, instead of part 3, used for "follow-up" purposes.

Dating of Nonfield Jobs

Definite dates for the accomplishment of nonfield jobs, such as office, maintenance of equipment, care of quarters, etc., have not ordinarily been set up. If not, they should be listed on the last page of each month's plan under the caption "Nonfield jobs." This pro-

vides not only flexibility for the plan, but permits of these jobs being done on days when for some reason, field work might not be possible. If, however, it is known that the first or last of the month must be spent in the office, it should be so scheduled.

Dating of Trips

The trip plans in part 3 are on a monthly basis, but the frequency standards in part 1 often call for trips at more irregular intervals. Accordingly, if the standard frequencies are to be reasonably well attained the dates on which these frequencies occur should be carried forward from the part 1 notes to part 3. For example, if a certain inspection is to be made at monthly intervals the intent of this standard will not be complied with if the inspection is made between the 5th and 10th of one month and not again until between the 25th and 30th of the next month. Or, if a stated inspection is to be made at intervals of three weeks, it is evident that in some months two trips for this purpose should be taken and in other months only one. Hence, the necessity for placing the analyzed dates for each trip in part 3.

Another reason for the dating of trips is to aid in overcoming the very human tendency to postpone the handling of some classes of work. If this is done on a normal-load administrative unit during the peak season, often as the middle or last of the month approaches, there are not enough days left in the month in which to do the jobs which were scheduled for it.

A practical method to follow is to provide in the "trip dates" column, the period during which each trip should be taken, one day to several more days than the total time set up for the trip. For example, if the analysis shows it will take 8 days for a trip, the trip-dates column should schedule it between, say, June 5 and 15, a period of 11 days, instead of limiting the period to exactly 8 days. It should still be expected that the trip will consume eight days, but the exact eight days should not be specified. Thus the necessary degree of flexibility is provided and is made possible by using the dates made available by omitting dates for nonfield work and special duties, such as fire suppression and other jobs which either can not be dated or may be sandwiched in at any time.

There now remains a final checking back of the individual time set-ups from part 2 to part 1, especially of the travel time.

Balancing Time Set-Ups in Parts 1, 2, and 3

Within a specified limit of error, parts 1 and 2 should agree. Part 3 should agree with the clear (not lined out) figures in part 2. The lined-out figures, as shown above, cover jobs which can not be done. If there is no overload there will be no lined-out figures in part 2, in which case parts 2 and 3 should balance. This subject is discussed further in the paragraph on Revision, and a simple procedure is exemplified in Table 2.

123550—32——4

TABLE 2.—*Work sheet for distributing travel time to jobs and for balancing part 3 with parts 2 and 1*

(If there is no overload on the unit, parts 1, 2, and 3 should balance. *Where there is an overload* part 3 should balance with the "to be done" work in part 2. Part 1 should balance with the gross job in part 2. Parts 1 and 3 will not balance. Work up the time estimates for each trip on scratch sheets as follows. Retain them in the appendix. The time estimates are thus segregated by jobs by months and are easily available for transfer back to parts 1 and 2 and for use in part 3.)

	Guard inspection		Tool inspection		Range inspection		Quadrats		Telephone maintenance		Trail construction		S-22 sales	
	Job	Travel	Job	Travel	Job	Travel	Job	Travel	Job	Travel	Job	Travel	Job	Travel
TRIP 1—AUGUST														
From R. S. to Baldy L. O. inspect	0.2	0.4												
Then to Spike L. O. inspect	.2	.2												
To Valley allotment inspect					0.3	0.1								
Rechart quadrat there							0.4							
Check telephone maintenance crew									0.2	0.2				
Check Quarry trail construction crew											0.2	0.2		
Inspect Ridge allotment					.6	.1								
Handle small sales en route													0.3	
Inspect 3 tool caches en route			0.1											
Return to R. S		.2												
Total [1]	.4	1.0	.1		1.1	.2	.4		.2	.2	.2	.2	.3	

[1] The sum of the trip figures are for use in parts 1 and 2.

Trip 2. Work as above also.

NOTE.—See glossary for abbreviations, p. 85.

Fill-in Jobs

On some forest units it is necessary to provide a large number of days for anticipated fire-suppression duties. In many of the plans as now made if there is a smaller number of fires than are expected, surplus time, often a large amount of it, is made available. Other jobs may be found to be unnecessary when the scheduled time for doing them arrives, with the result that more free time is unexpectedly left available. In order that this time may be used to best advantage it is desirable for the planners to schedule in part 2 or part 3 in advance some "fill-in" jobs for unexpected surplus time in each month. Consideration of the development jobs in the analysis will often help to provide seasonable lists of substitute work for these periods.

Sample Trip Description

On page 46 is a sample trip description. More detail is often desirable. Note that job and travel times have been indicated separately for each of the individual items of work. This enables a check back of the figures to parts 2 and 1.

Synchronizing Trips

If the plans of a ranger, for example, are to be followed they must, of course, be considered by his superiors not only when unanticipated work comes up, but also in planning trips to the ranger's territory. In developing the actual trip plans for supervisors and others in the higher grades it *is most necessary*, therefore, to synchronize, so far as practicable the two plans involved. The best way to do this is to prepare both of the plans concurrently. Following this practice, the supervisor would, to a reasonable extent, plan his general inspection of a ranger district so that he would cover country at the time the ranger needed to go into it.

Analysis, Plans, and Duplicate Travel

Part 3 is an essential section of the job-load analysis, as it is here that travel is analyzed to determine the amount of duplicate (excess) travel in the original write-up of part 1. Not until the separate jobs in part 1 have been grouped by trips is it possible to determine the net travel time. This point is one of the most important differences between previous forms of analysis and planning and the method here described, and is easily understood by considering that the charging of separate in-and-out time from headquarters for each job as though each were to be the cause of a special trip, when as a matter of good administration and actual practice several jobs will be done on each trip, leads to an erroneously duplicated set-up of travel time. With this exception, part 3 is simply a plan of work and parts 1 and 2 are the analysis.

Originally the plans which resulted from the analysis of travel requirements were considered a by-product. Later the need for plans to activate and motorize the job specifications in the analyses became increasingly apparent. There was a tendency for them to become "just another plan," unless means were provided to show how they could and should be used. Reasonably close adherence to the plans was finally found to produce the best results, and instead of being treated as a by-product properly conceived plans are now considered a most vital part of this adaptation of the scientific method to forest administration.

Form 578w

SAMPLE—JOB-LOAD ANALYSIS—PART 3—TRIP AND JOB PLAN

Month, June.

Composite forest.
Composite district.
Plan made March 10, 1930, by F. R. M., F. R. O.

Assigned to	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
Ranger	4–16	Trip No. 1.—								
		With pack outfit, principally to train guards at point of duty, inspect limited area of adjacent spring C. & H. ranges enroute. From R. S. to Genessee lookout point, inspecting High Rolls C. & H. allotment via Big Draw, Echo Gulch, Peavo Draw, and High Rolls Ridge.			1	0		All.		
		Install fire signs en route.				1		x		
		Observe vegetative readiness at Cutler Hill observation station.				x		x		
		Train lookout-fireman at Genessee (an experienced man).				4		x		
		To Kettle Rock L. O. (part travel is guard Insp.).						3		
		Inspect spring range in Maxwell country through Blue Mesa rim around head of Porcupine.			1	3		All.		
		Train lookout-fireman at Kettle Rock (new man) take him on trips adjacent to his station.			1	0				
		Inspect special uses en route at Billings and at Jones places.				1		x		
		Check on condition of High Rolls recreation area.				x		x		
		Inspect condition of range improvements.				x		x		
		To Mount Hough. Train guard (new) at point of duty and take him on trips in adjacent country.			1	0		6		
		Then southwest back into spring C. & H. range over the Little Tongue basin inspecting spring range over the Ingalls allotment and Potlatch ridge to Mt. Ingalls L. O.			1	4		All.		
		Train Mt. Ingalls lookout-fireman at point of duty (experienced man).				4		3		
		Check condition of Potlatch recreation camp.				x				
		Handle small sales in vicinity of Potlatch.				2				
		Detour to observation plot in dry fork for vegetative, readiness data, observing same at Mickle Mine en route.				1		3		
		Return over spring range to Twin Creek R. S. inspecting ranges en route in Copper Mine, Bold Knob, and Twin Creek canyons.			1	1		All.		
		Total for trip 1			8	5	1	7	10	4
		Other new jobs:								

	Trip No. 2.								
18–28	Continue with pack outfit on spring C. & H. range inspection to Fool Creek country. Inspect trail crew en route.				1		x		
	Observe vegetative readiness at observation station there. Time includes observations later at two other stations.				1		x		
	Inspect C. & H. ranges via Spring Gulch, lower Maxwell country, Gullett Basin, Forks of the Tongues, South Dry Fork, and Tusas. Return to R. S.			4	0		All.		
	En route handle such small sales as come up.				1		x		
	Inspect Blackburn, Joe Peterson, and James uses.				x		x		
	Check condition Spring Gulch and Dry Fork public camp and see that they are in orderly condition.				1				
	Inspection condition of range improvements.				x				
	Post fire signs.				1				
	Total for trip 2.			4	5	x	G	4	5
	Other new jobs.								
	SPECIAL TRIPS OR PROJECTS								
1–3	A. Hold guard training camp at Twin Creeks.			3	0			3	0
	B. Count C. & H. at Freezout corral; repair corral.			1	0			1	0
	C. Follow-up action on spring C. & H. inspection. (See part 1.).				4		3		7
	D. Count S. & G. at corral near R. S. repair corral.				6				6
	E. Law enforcement cases (2).			1	0			1	0
	F. Fire fighting.			2	0			2	0
	Other new jobs:								
	Nonfield as itemized in part 2 (the job list).		-	5	1			5	1
	"Fill-in-jobs" as follows:								
	Visibility map—Pilado Peak—1-day job.								
	Visibility map—Arrester Peak—1-day job.								
	Road location—Motor ways—6-day job.								
	Totals	5	1			2	2	28	7

NOTE.—See glossary for abbreviations, p. 85.

Properly conceived, the plans integrate a multitude of separate jobs into an interlocked whole—assemble the pigments into a harmonious picture.

WHO SHOULD MAKE THE PLANS?

The question, Who should make the plans? apparently has only one answer among management engineers to whom such phrases as "routing," "methods," "synthesis," "layouts," "motions," "schedules," "processing," and "sequences," are associated with a special planning department which usually has two distinct major functions: (1) Routing and (2) preparation of detailed instruction cards defining the manner in which individual operations ought to be performed. "The principle [staff and line form of organization] is based upon what is held to be a profound distinction between human beings. Some have the minds of men of action—leaders, executives. Others have the minds of thinkers—scientists, planners, engineers. Again, just as in the human body there are sensory and perceptive, also motor nerve centers of activity, so it is suggested that, in * * * organization * * * a similar distinction should be drawn between the planning of action and policy, with all its essential business of inquiry and analysis, and the actual direction of work" (*17, p. 17*).

This distinction is commonly advocated by many authorities. Before the advent of management as a recognized science, Adam Smith held that the various functions of labor should be divided. Likewise, in the texts of the Alexander Hamilton Institute, production is divided between planning and actual doing where the quantities involved justify their separation. Frederick states that *a planning department can double the output.*

Person (*25, p. 26–27*) is particularly to the point in his statement: "Predetermination compels the recognition of design as a function distinct from execution, and requiring different capacities. This does not signify a less respect for the importance of execution and of *executive ability;* it signifies the recognition of another equally important supplementary function and capacity." And reminiscent of the experience which many have had he says (*24, p. 5*): "Planning generally had not been effective because it was based on so many chance factors. Now [under scientific management] with the aid of standardization, calculations could be made with a fair degree of certainty. This made possible the planning-room procedures of routing, scheduling and complete and economical utilization of facilities. It was this precise control through planning and preparation which secured most of the results of increased productivity * * *."

Another author advocated the scheduling of work by stated periods rather than by so many hours per week. This is a feature which experience with planning has shown to be essential to obtaining high-grade results.

Experience in forest supervision also has shown that all men are not equally good at planning; that new men are often coming into the work; that a percentage at least of the older men do not think in terms of groups of jobs; and that the administrative men in the supervisory forces have in most cases risen through their ability in this respect and should utilize this ability. To that extent agree-

ment in planning supervisory work is had with the management engineers whose publications it should be noted have dealt almost entirely with lower caliber work. This agreement, however, does not extend to having the planning done entirely by specialists, and although this method has not been tried, it is not believed suited to the class of positions under discussion.

In the method that has been used, excellent results have been obtained by having the plans made by the man who is to use them; the planning being done with the aid and directive guidance of a superior official, who depends considerably on the planning ability of the subordinate. That this assistance should be given is vitally important, as is brought out in the foregoing quotations.

A local plan prepared in this way should and will give full consideration to the point of view of the one who is to use it, his temperament, home life, hobbies, hopes, and weaknesses. As his ability to plan grows and is demonstrated, less assistance should be given him and he should be led finally to the full development of his responsibilities for this important activity.

MISCELLANEOUS

STEP 7. CONCLUSIONS AND RECOMMENDATIONS, FOREWORD AND INSTRUCTIONS

After having gone through all the effort involved in the preparation of parts 1, 2, and 3 of the study, the data thus made available should be considered, *conclusions drawn*, and definite written *recommendations made by the analyst*, else he falls in a class with the writer regarding whom Croly, as reported by Littell (*20, p. 244*), said: "Yes, So-and-so's mind is orderly, thorough, and sturdily combative. But he does not reflect. Shut him up in a room with a set of facts and when he comes out he hasn't added anything to them. They haven't given him a new idea. He's merely arranged them brilliantly." This is mentioned because analyses have too often been treated as an end in themselves, and not studied to determine the possible changes in organization that they may suggest.

The following steps are called for as a minimum: (1) If there is an underload of work of proper caliber a statement should be attached to the analysis bringing this point out clearly, and showing what should be done about it in terms of possible consolidations with other units, of hitherto unplanned development work, of handling the work in whole or in part on a functional basis by a central staff, of superstandards, or in any other way that the local situation may suggest. (2) Where there is a surplus of proper-caliber work the supplemental statement should indicate how such surplus will be taken care of—by assistance through detail of other men not having a full load on their units, employment of qualified alternates or administrative guards, and detail of men from the staff, etc. Or, if there is apparently no way of taking care of the surplus with the present organization and funds, a statement should be made recommending how it should be taken care of. Where the form of assistance to be furnished is known, the monthly plans for such assistants may be attached to the analyses. (3) In like manner consider the remainder of the 22 problems and aims listed on pages 9 to 13.

Distinctions in the Use of Analyses and Plans Between Executives and Those Occupying Positions of Greater Responsibility

General information concerning the use of the analysis and plan itself should be provided. That not available in such form as manuals or handbooks should be placed in the Foreword. It is here that any distinction should be brought out in the desired degree of compliance with the schedules, as between the subordinate supervisory officials and those in higher grades. The relatively close compliance called for in the sample Foreword (p. 51) has been expected of those occupying the junior executive positions. As the degree of responsibility increases it has been the practice to lessen the degree of anticipated compliance with the trip schedules and in the higher-grade positions to treat the schedules as guides to best practice but to measure the value of the administration by results obtained, with the proviso that the results must be as good as called for by the job specifications. The most recent studies and observations, however, have strongly indicated the desirability of applying in general, to at least some of the higher positions, the same principles of trip scheduling as has been found to be effective in the subordinate positions.

In the sample instructions note particularly in such phrases as "justifiable," the flexibility inherent in the properly understood use of the schedules. These statements do not take the control and direction out of the plans, when departures from them are justified, but leave them susceptible to intelligent use. Nevertheless, there is purposely a degree of inflexibility in the schedules because of repeated disappointments with conditions on the ground, following the use or disuse of wideopen plans. It should not be necessary to add that even this rigorous policy still leaves the idea included in the following reminiscence, by Ranger J. J. Lowell, of paramount and controlling importance: "A remark that Inspector Cox made one night at Ophir Loop has never been forgotten and has been a help to me during my many years of service. I was asking Mr. Cox about the Use Book and he answered me thus: 'Jim, the Use Book is a good guide, but if you haven't a head of your own, you are not worth a damn to the Forest Service.' How true it has been! I have never forgotten that remark."

It has been generally felt that the Foreword should be brief and may include instructions as to:

Follow-up.
The degree of compliance exacted.
The place of the plan in relation to other instructions.
The character of records to be kept and the amount of time studies to be undertaken.
What should be done in case planned jobs do not develop, or unforeseen work and other unavoidable complications interfere with the handling of the work as planned.
How and when revisions in the plan should be made.
Other "good pointers."

(Sample Foreword and Instructions)

ADMINISTRATIVE PLAN

Composite Ranger District Composite National Forest

Part 1. The local standards for each job which can be foreseen.
Part 2. The job lists.
Part 3. The trip plans and schedules.

FOREWORD

This plan, prepared jointly by the supervisor and district ranger, establishes a basis for mutual appreciation of the ranger-district job as a whole, and for the systematic performance of that job with the minimum of effort. Its successful accomplishment demands adherence to the trip plans, schedules, inclusive dates, and the stated local standards of perfection and frequency, unless the exception is reasonably justifiable. Since these standards are fixed with the relative needs of the whole district job in mind, to deviate from them by adding unnecessary refinements to certain tasks and slighting others, will usually result in poorly balanced performance.

A week in advance of each month the trip plan for that month will be reviewed, and where major variations are clearly necessary, the trip plan will be modified accordingly, but with as few changes as practicable. A copy of any such revised trip plan, involving major variations, will be sent to the supervisor a week before the beginning of the month concerned, for approval. Other justifiable variations may be made without previous approval. This includes the addition of minor miscellaneous small jobs previously unforeseen, which generally can and should be incorporated with the work previously set up.

In the event of justifiable interruptions later, such as nonscheduled jobs of higher priority or visits from superior officers which can not be welded in with the planned trips, the new work will be included and the less important scheduled work dropped to be later welded in, so far as possible, with other trips. Such adjustments must be based on careful judgment and limited to the clear-cut needs of the situation.

GOOD POINTERS

(*a*) Push all possible unscheduled work out of the peak season.

(*b*) When a bad break in important trips threatens, such as an unavoidable scaling job, a request for help from the supervisor's office may avoid the break.

Follow-up.—The ranger will report to the supervisor at the end of each month on a duplicate copy of the trip plan, as instructed, and show the degree of success he attained during that month in following the plan.

Unless otherwise specified, all jobs listed are to be done by the ranger in charge or a qualified assistant.

Annually, during the winter season, the plan will be revised, in conference, and trip schedules will be prepared for the following year.

Through thoughtful consideration by the officers concerned and additional study of all the elements involved, the plan should be gradually perfected and become an increasingly valuable tool of administration.

Standards established and plan approved by
F. R. MISMO,
Forest Ranger.

Date: March 10, 1930

F. R. OTRO,
Forest Supervisor.

(Sample Foreword and Instructions)

JOB-LOAD ANALYSIS, FOREST SUPERVISORY WORK, COEUR D'ALENE NATIONAL FOREST, 1930

FOREWORD

This analysis is based on average and normal work and conditions. The trip plans attached to it have been made to determine for the analysis the average travel-time needs and probably will not at times fit actual conditions.

Thorough supervision and inspection and balanced standards of results have been uppermost in mind in determining the time requirements. These should be flexibly adequate, and the work plans should be reasonably practicable to follow. System must be used to make them so. Essential to the development of an effective system will be, among other obvious points of practice, the avoidance of:

1. Allowing nonfield work of lower priority to interfere with starting or continuing trips as scheduled.
2. Visiting officers failing to match their trips with those of the supervisory staff.

Also essential to the development of such a system are:

1. Delegating to the subsupervisory forces, especially during the summer months, all the work which in this analysis is delegated to them. This includes the hiring of laborers and handling of minor routine duties.
2. Participating in all classes of field work instead of specializing to such an extent that several officers need to follow each other into the same region to handle the various classes of work—Fire—Roads—S.—G., etc.

STEP 8. MAKING THE PLAN WORK—FOLLOW-UP

The truest test of a plan is its workability and the results obtained under it on the job. Given cooperative consideration by those occupying other positions, if a plan for a stated volume of work can not usually be followed reasonably well, the analysis is wrong. This presumes a type of personnel which although diverted time and again by situations not clearly anticipated in the plans, has the intelligence to adjust, substitute, improvise, and otherwise fit these "unexpecteds" into their proper place in the schedules, and the persistence to return time and again to their general completion. Plans are and should be at times, at least during the relatively short peak season, a severe self-imposed taskmaster. Like other good resolutions, they are subject to alibis usually well rationalized but nevertheless effective in their undermining qualities.

Long experience with plans has, with notable exceptions, shown that the degree to which they are used depends, at least during the training stages of scheduling, more upon the intelligent interest of the officer immediately superior to the one who is using the plan, than on any other factor. Comparison of planned work with that which has actually been done has repeatedly shown little relation between them. Analysis of these cases has frequently disclosed that the failure of the plan was due to the employee himself, to poorly advised and sudden changes on the part of his superior, or to some other factor which could have been controlled by cooperative, interested, and directive supervision. Without this element provided in some definite, current, and recurrent way effective results under planning should not be expected.

The literature on this subject abounds with such statements as: "More men can * * * plan a * * * [campaign] than there can be found generals who will successfully bring such plans to a conclusion" (*10, p. 202*). Eternal vigilance is required to maintain standards. "And after a standard plan is established, understanding, acceptance, usage, and vigilence are required for its maintenance; (or) * * * the standard will deteriorate through inertia * * * (*7, p. 196*).

Principally based on past experience, but supported by the conclusions of those who have had wide experience in the use of the scientific method in getting things done, the follow-up feature was included in the planning procedure. It ranks very high in importance.

For the junior supervisory positions the instructions (see the sample Foreword, p. 51) usually state that the official is required or expected to adhere to the schedules unless he has "justifiable" reason to do otherwise. A current monthly follow-up report for this grade of employee is then required. This serves:

(1) To assist the supervisor in fulfilling his responsibility, through providing a current check on efforts to follow plans, thus facilitating the immediate correction of wrong practices which may develop in the relatively long interval between field-inspection trips.

(2) To get the work done, through the incentive the user of the plans will gain from a periodic cast up of the success he has had in doing what he had formerly felt should be done (jobs) and from comparing his relative success in planning and meeting his plans from month to month.

(3) To get the work done, as it had formerly been agreed that it should be done, in an orderly, clean-up-as-you-go manner, as shown in the trip plans.

(4) To obtain data for strengthening the plans.

The method which should be used for this form of follow-up should require that the report be—

(1) Submitted currently by months.

(2) For each trip show:

(*a*) Whether it was taken as a practically continuous trip. (Procedure.)

(*b*) To what extent the various jobs set up for the trip were done and done with the planned degree of excellence.

(*c*) The specific reasons, in brief, if any trips or jobs were not completed as planned. (Reversal of the planned route of travel does not usually constitute noncompliance.)

(*d*) Additional time-consuming jobs done en route.

(*e*) Whether it was made within the general period of the month and order called for in the plan.

(*f*) Total time for the trip.

(3) For other planned major jobs: Whether they were done, and brief specific reasons if not done. This does not apply to small jobs which may be itemized under miscellaneous field captions.

(4) Other major jobs done which were not in the plan and which were not done on the planned trips—see 2 (*d*).

(5) Total time for month divided between field and nonfield.

On pages 56 to 58 is shown two sample forms which meet the above minimum requirements. This form which uses a carbon copy of the monthly plan is very simple, effective, and nontime consuming. Note that in using it (1) a red line is drawn through jobs which have been done. (2) Time-consuming jobs which were not in the plan but which were done are added in longhand, or in any other way to distinguish them from the original plan, beneath the trip plan involved if the jobs were done on a trip; if not they are shown beneath the Special Jobs which have been listed for that month. All of these additional jobs are also, of course, ruled out in red to show that they have been done. (3) The *actual total* time for the trip is shown in red as well as for nontrip jobs of major caliber. (4) A brief statement of reasons for any appreciable departure from the plan in procedure, quantity or quality. (5) Total time for the month divided between field and nonfield.

A follow-up procedure for nonfield months which may not be covered by part 3 plans is discussed on page 42.

Form 578w

SAMPLE—JOB-LOAD ANALYSIS, PART 3

TRIP AND JOB PLAN

Month, August

This forest
That ranger district
Plan made: Sample ——

Assigned to	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
		Trip No. 1.								
~~1–9~~		~~With pack from Bearskin R. S. to Mossy.~~					1	2		
		~~En route inspect fire guards at Big Hole,~~				2				
1–8		~~Turner,~~				2				
		~~Old Man.~~				2				
		~~From Mossy inspect Carter S. & G. units.~~			2	2				
		~~Over Eureka Gulch C. & H. unit.~~			1	2				
		~~En route inspect public camps at Dew Drop,~~								
		~~Green Brier,~~					1	0		
		~~Turtle Creek.~~								
		~~Return via Pinkham Ridge to Bearskin.~~						6		
		Trip total			5	2	2	0	7	2
		~~(In addition established sample plot in Eureka Gulch (.4)).~~								
		Trip No. 1 completed as planned.								
		Actual.							*(8*	*2)*
~~10–13~~		Trip No. 2.								
		By auto to Jones mill.						1		
		Mark and inspect.				4				
		Scale.				2				
		Continue to Smith mill.						2		

NOTE.—In actual use of this form those sections shown here in italic are shown in red. The cross-out lines are also in red.

	Mark and inspect.				3				
	Scale.				3				
	Return to Bearskin R. S.						1		
	Trip total.			1	4		4	2	0
	Trip No. 2 not made because mills not operating.								
	Actual.							(0	0)
	Trip No. 3.								
~~14–22~~	~~By horse from Bearskin R. S. to Big Tom Lake.~~						6		
16–18	~~Inspect cabins and resorts to Big Tom Lake.~~				3				
	~~Survey Special Use of ———~~.				3				
	~~Inspect Registrar at Big Tom.~~				2				
	Continue to Flat Top Lookout. Inspect guard there.				2		4		
	En route inspect 3 public camps				1				
	and group of summer homes in Dry Gulch.				1				
	Continue over Long Valley S. & G. units.			1	6				
	Return to Bearskin R. S.						2		
	Total trip.			3	2	1	4	4	6
	Actual.							(2	0)
	Trip No. 3 called off by supervisor so I could accompany congressional party (2.4).								
	Actual.							(2	4)
~~23–31~~	Trip No. 4.								
	~~With pack outfit from Bearskin R. S. to Omar (.6).~~						6		
23–24	~~En route inspect Grassy Meadow units via Dell,~~ Ann.			6	2				
27–31	~~Parr,~~ Saguache, ~~Elder Valleys to Bearskin R. S.~~								
	Total trip.			6	2		6	7	
	Trip No. 4 completed except as noted. Range in such excellent condition usual intense inspection unnecessary. Interrupted by North Mountain fire but returned and completed trip.								
	Actual exclusive of fire.							(6	0)

SAMPLE—JOB-LOAD ANALYSIS, PART 3—Continued

TRIP AND JOB PLAN—Continued

Month, August—Continued

Assigned to	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
		Special jobs								
	25–26	~~Fire Suppression.~~			2				2	0
		Actual.							*(1*	*4)*
		Miscellaneous nonfield								
		As itemized in Part 2.	3	4					*3*	*4*
		Other unplanned work done:								
		~~Trip to start crew on Summit telephone line.~~							*1*	*4*
		~~To Sec. 1, T. 3 N., R. 6 E. to investigate S. trespass.~~							*1*	*2*
		~~Reclassification report.~~							*1*	*0*
		~~Planned.~~	~~3~~	~~4~~	~~18~~	~~2~~	~~4~~	~~6~~	~~26~~	~~4~~
		Actual.	*(4*	*0*	*Field*		*23*	*4*	*27*	*4)*

Discussions regarding adequate trip planning have in the past been subject to so much misinterpretation and misunderstanding that considerable available case material to establish a background would be included here, were it not that those interested in the subject can draw upon their own experience for cases to complete the picture. If, for example, a trip plan calls for the inspection of six guard stations, and other jobs en route, and no fire-suppression needs beyond those set up in the plan or other high-priority unexpecteds occur, then any supervisory officer would want to have the guards inspected. Or when a range, or a sale, or a camp, or any other inspection trip has been felt to be necessary to the extent of being placed in a trip plan, and if no specifically justifiable reasons arise for not making the inspection with the degree of thoroughness originally contemplated, the supervisory officer will want to know why it was not done, and see that proper corrective action is taken. There also would be agreement, no doubt, among executives in barring as "justifiable reasons" for not following the plans, at least during the relatively brief peak season, such things as excessive nonfield time, overriding hobbies such as improvement work, lost time due to in-and-out trips to jobs which should have been grouped progressively, and other poor practices which, too commonly, creep in under loose management.

To offset the thought that follow-up reports as above outlined call for an unprecedented amount of paper work—it requires from 15 minutes to 2 hours per month to complete them—consider the following which is at the other extreme in amount of detail involved:

"Routine control of salesmen is therefore exercised most often at the present time through frequent reports from him, such as:

"(1). A daily report on the number of calls.

"(2). A daily report on the sales resulting from the calls made.

"(3). A daily report on orders lost.

"(4). A daily report of the time spent in towns, in traveling, with customers.

"(5). A daily report of expense in proper detail.

"Anything out of the usual routine has to secure the approval of the district manager, who can make each case an opportunity for constructive suggestion or let it lapse into a merely routine operation." (Keir and Dennison (*14, p. 293*).)

In continuance of the comparison between the methods developed from experience in forest administration and the systems used by management engineers it is found that "Taylor insisted on continuous inspection. Occasional inspection by a summary of records would have been sufficient for appraisal of individual capacity. The primary reason for continuity of inspection, on the other hand, was to detect carelessness and indifference with respect to standards, and to bring them to the attention of those responsible in time for correction before the flow of work and costs would be in large degree unfavorably affected" * * * (*27, p. 386*).

"With respect to all of these devices for inspection of performance it should be observed, first, that they are identical in principle; second, that they differ mainly in graphical symbolization; third, that they are used to check progress on work and control the flow; and, fourth, that they may be used to a greater or less extent for purposes of instruction and inducing voluntary improvement

of conditions and methods * * *. As has been noted, it is with respect to this fourth use that the Gantt Charts have become famous * * *.

"It should be observed that the principal purpose of such progress records is the maintenance of the flow of work through maintenance of the conditions (by discovery of lapses) on which the scheduling is based. They are not used directly for the appraisal of a worker's efficiency, for his efficiency should be judged by his normal or long-time performance." (*27, p. 389.*)

As brought out by Frederick (*10, p. 211, 213–214*), "One set of men may operate a plan and fail, and another set may operate the same plan and succeed. The old way was * * * a post mortem, * * *. The new way is to plan for the year *in advance* * * * (on a budget plan) which may be easily checked up * * * monthly * * * [as] to the goal set. The * * * task is hardest at the start of budget operation, but thereafter it is largely automatic and highly labor-saving, greatly facilitating research * * *. The budget * * * is a contest in character * * * relished by all. Results should be shown preferably in per cent of accomplishments versus budget. The first wavering variation in budgeting and actual starts an investigation as to why."

Somewhat contrary to this last statement is Taylor's that—"There should be, of course, constant inspection of every unit of performance by routine comparison of results and costs with the corresponding items of the predetermined plan; but only those items should be brought to the executive's attention which disclose serious variations from the predetermined standard" (*13, p. 397*).

As stated above, trip scheduling and follow-up have been developed principally for use in the district-ranger grade. Insufficient information is available as to how much higher in the executive positions, more or less exact scheduling should be attempted. However, as stated in the section, Foreword and instructions, the most recent studies and observations indicate strongly that these principles should, in general, be followed by officials in at least some of the higher grades.

One of the regional foresters (a position of major responsibility) has said that he finally found that scheduling of his own work was necessary if he wished to get certain jobs done. Experience had shown him that other jobs were always coming up which because they seemed to need his attention diverted him from those which he had originally planned to do but had not definitely scheduled.

Another in the same vein, has stated that the schedules must become one's "taskmaster" if the work is to be done.

What Work Should be Included in Determining the Job Weight of Managing an Administrative Unit

(1) The essential, proper-caliber, *recurrent* work consistent with the responsibility of the position—

- (*a*) All routine, all common managerial activities and supervision of ordinary activities and maintenance; in addition, maintenance which is in such small amounts at distant points that it is not economical to delegate it to others or to hire labor to do it.
- (*b*) Well-substantiated estimates of probable new work (see above), which will become recurrent within the next three to five years.
- (*c*) Allowance for supervision of construction, for an indefinite period on many forests (as in the fire regions).

(2) *Development* work which, because of some local considerations, has become recurrent work, viz, Insect and blister-rust observations and control work, scattered land-exchange possibilities, and similar activities of such a volume as not to justify their being on a project basis. (See discussion below.)

(*a*) An as yet undefined amount of minor research-sample-plot observations, quadrats, etc.

Ordinarily there is no difficulty in determining from the analyses whether any particular job should be included in the job-weighing allowance. When doubtful entries are found, however, it should be the policy to get a decision on them from the branch chief concerned, or if a necessity for correlation between branches arises, a conference between them should be arranged.

It is necessary to bear in mind that the weight of the job load is based on the above work for only the peak-of-the-peak period of three months in the fire regions and for the peak five months elsewhere. This leaves time available out of the peak for resource surveys, management-plan work, boundary posting, trail locating, etc. For this reason development work in the peak season should be scrutinized closely.

STEP 9. CORRELATION—REVIEW—REASONABLY UNIFORM METHODS

Consideration of the "problems and aims" of the job-load studies, especially those dealing with fairness in financing, fairness in weighing the job load between individuals, fairness in compensation, and fairness in quality-of-work standards, shows that when an organization includes more than a very few units the analysis should be correlated as thoroughly as possible. This may be accomplished by the use of normal or correlating standards where they are applicable, and by the analytical review of all analyses by the most competent disinterested authorities available. It is this step in the procedure that calls for similarity in the general form of the analyses. It is also one of the reasons why the detailed items—unit times, unit volumes, frequency, etc.—on which the analysis and plan were based, should be made of easily understood record.

A check list based on the essentials of good analyzing and planning has been found to be a requisite to thoroughgoing reviews. Conversion of time set-ups to their equivalent in terms of dollars also aids, since easily determined indicators of standards which need particular review are thus provided to the experienced executive.

In a large and widespread organization the possibilities for unwarranted variations between reasonably comparable units, in standards of quality, quantity, and time are very liable to be tremendous, although the reviewer should bear in mind that he has a very real responsibility in recognizing and acknowledging that special problems merit special attention. A difficult silvicultural problem here, an eroded range there, a cooperative operator on this sale, a troublesome one on some other area demand varying amounts of attention.

Computed Job-Load Weights

The correlation of the analyses should be made on the basis of comprehensive reviews covering the study of each position. If this is impracticable, due to the inadequacies of the analyses, or to the urgent need for the comparative job weights of such a large number

of units that analytical reviews can not be made sufficiently soon, then as a second-best method the indicated average weight of the job loads of positions of comparable caliber (having comparable authority) may be computed.

This subject which has been treated in the lithographed pamphlets, Correlating Standards and Converting Factors for Determining the Job-load Weights of Recurrent Work on Ranger Districts, and Computed Index Weights of Ranger District Job-Loads by Regions, Forests, Ranger Districts and Activities,[7] is too broad to discuss again fully in this publication. In brief, the method calls for the determination of correlating standards (CS) for each line of work, and is based on qualified data from a large number of individual analyses and time studies to determine the average peak-season time requirements (converting factors—CF) for doing this work as it should be done. The proper converting factor applied to each item of work (p. 5), converts units of work into units of time, and the total shows the amount of time required to handle the peak-season work on each administrative unit, *provided average conditions prevail there.* The computed weights are not rated as the actual weights of individual activities or administrative units. They are broad averages only. The accuracy of the computed weight of any ranger district is dependent to some extent on compensating variations between the numerous activities on which the index weight is based. Likewise, the accuracy of the total ranger-district load in any region is dependent upon compensating differences between the ranger districts with that region. Thus, *averages are depended upon to absorb ordinary variations between activities* and districts. This should be considered when comparing the computed time for any activity or district with the actual time, or with the time set-ups in its local analysis. Volume tables which often will not show accurately the number of board feet in a single tree, but will be reasonably accurate for a group of trees, are comparable in this sense to the converting factors.

The following are samples of the correlating standards and converting factors and of the computed weights of a few forest units. These are illustrative of the method which, it should be understood, is not a direct phase of job-load analysis.

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[7] Loveridge, E. W. U. S. Dept. Agr., Forest Serv. 1930 (Unpublished).

2nd Sheet (Fire Control)

(Sample Correlating Standards and Converting Factors)

Item F-3 No. of Regular Fire Guard Stations Exclusive Short-term Registrars

A guard training camp of 3 days duration will be held prior to the opening of the fire season and will be attended by each guard where this form of group training is practicable.

In addition these guards will be trained at their points of duty; the duration of this phase of training will depend on the experience of the guard and the class of work he will be engaged in - all as specified in the local analysis: The basis used here is 1 additional day for new men; 4 hours for experienced men who know their control zones. Where guard training camps are not held each new guard will be given 2 days of training at his point of duty prior to the opening of the fire season and experienced guards one day each providing the total time for these individual training periods does not exceed the time required for training the guards at a group camp.

That part of the preparation for the camps which cannot be done preseason will be done by the District ranger. Breaking the camps will be done in major part by the temporary men.

Showing guards the routes of travel etc. will as a rule be done in connection with trail work, posting of fire warnings, range inspection etc. It is also considered good practice for guards to engage in improvement work in advance of the fire season so as to become acquainted with the country and also to reduce the time needed by the ranger for this purpose during the peak season.

Improvement crew and other foremen plus 25% - 100% of each crew will be trained in fire control at the group training camps or otherwise incidental to guard training.

Guard Inspections - at each station - will be done at monthly intervals (so far as the inspection itself is concerned a very thorough one may, according to studies, be made in 1½ hours. Twice that figure is used in the converting factor table, ie; 3 hours for each inspection exclusive of travel etc.)

Packing-in of Guards and Provisioning them later will be done in connection with training at point of duty and at the time of the monthly inspection trips. Where there are several guards on a district or if other arrangements can be made the ranger will be relieved of this work. Guards off - packing & closing up stations - customarily done by the guards or by other members of the short term force. Done elsewhere on the last trip to specified stations - outpeak on some CF-3 Forests.

	Travel - Unit time -	6	6	6	5¾	5½	5½	5	5	5	4¾	4½	4½	4¼	4	4	4	4	4	4	4						3.6
	For Item F-3	Number of Guard Stations (For fractions of months-interpolate)																									
	For CF-3 - See P-13 Exclusive Headquarters Guard(see p-13)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	Guard Train. Camp Prepare in part prepeak. Hold	*	*	3.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Deduct one from Item F-3 to determine No. of F-3 stations	1st trip Train at point of duty (⅔ new men) (June 22-July 4) This is in addition to camp training - Job	2.0	2.4	2.0	3.0	3.6	4.4	5.2	6.0	6.6	7.4	8.2	9.0	9.6	10.4	11.2	12.0	12.6	13.4	14.2	15.0	15.6	16.4	17.2	18.0	18.6	
	2nd trip - Inspection - job - (July 22-Aug.4)-	.3	.6	1.1	1.4	1.7	2.2	2.5	3.0	3.3	3.6	4.1	4.4	4.7	5.2	5.5	6.0	6.3	6.6	7.1	7.4	7.7	8.2	8.5	9.0	9.3	
	3rd " " " (Aug.22-Sept.4)-	.3	.6	1.1	1.4	1.7	2.2	2.5	3.0	3.3	3.6	4.1	4.4	4.7	5.2	5.5	6.0	6.3	6.6	7.1	7.4	7.7	8.2	8.5	9.0	9.3	
	1st " Travel (Station to next station) (multiply No. of stations x unit travel time)	.6	1.4	2.2	2.7	3.4	4.1	4.3	5.0	5.5	6.0	6.2	6.6	7.1	7.2	7.4	8.0	8.4	9.0	9.4	10.0	10.2	10.4	10.6	11.0	11.2	
	2nd & 3rd Trip - Travel	1.4	3.0	4.4	5.6	7.0	8.2	8.6	10.0	11.2	12.0	12.4	13.4	14.2	14.4	15.0	16.0	17.0	18.0	19.0	20.0	20.4	21.0	21.4	22.0	22.4	
STEP 1 (F-3A) -	Totals for CF-3 (months) Foreste	5.0	8.4	14.0	18.0	23.0	26.3	28.5	32.0	34.3	38.0	41.2	43.2	45.7	47.6	50.6	53.0	56.0	59.0	62.0	65.0	67.2	69.4	71.6	74.0	76.2	
	No. of Guard Stations CF-5 F-3 total	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20						
(F-3C) -	CF-5 Forests See Item P-15 3 months Fire Season - Use - (as above)	5.0	8.4	14.0	18.0	23.0	26.3	28.5	32.0	34.3	38.0	41.2	43.2	45.7	47.6	50.6	53.0	56.0	59.0	62.0	65.0	67.2	69.4	71.6	74.0	76.2	
	Job -	.3	.6	1.1	1.4	1.7	2.2	2.5	3.0	3.3	3.6	4.1	4.4	4.7	5.2	5.5	6.0	6.3	6.6	7.1	7.4	Job					
	CF-5 Foreete See Item P-15 4 months Fire season (Add 1 insp.) - incl. travel	5.6	10.0	16.2	20.7	26.4	30.4	33.0	37.0	40.0	44.0	47.4	50.0	53.0	55.0	58.2	61.0	64.4	68.0	71.4	75.0	CF-3 + travel					
(F-3D) -	CF-5 Forests See Item P-15 4 months Fire Season Total to Use	6.1	10.6	17.3	22.3	28.3	32.6	35.5	40.0	43.3	47.6	51.5	54.4	57.7	60.2	63.7	67.0	70.7	74.6	78.5	82.4						
	CF-5 Foreste See Item P-15 5 months and up Fire Season (Add 2 insp.)- incl. travel	6.4	11.4	18.4	23.6	30.0	34.5	37.3	42.0	45.5	50.0	53.6	56.6	60.1	62.2	65.6	69.0	73.0	77.0	81.0	85.0						

			Job (2)	.6	1.4	2.2	3.0	3.6	4.4	5.2	6.0	6.6	7.4	8.2	9.0	9.6	10.4	11.2	12.0	12.6	13.4	14.2	15.0	
	(F-3E)	-	CF-5 Forests See Item P-15 5 months and up Fire Season - Total to Use	7.2	13.0	20.6	26.6	33.6	39.1	42.5	48.0	52.3	57.4	62.0	65.6	69.7	72.6	77.0	81.0	85.6	90.4	95.2	100.0	
STEP 2	(F-3F)	-	Effect of Grazing time allowances on Guard Station Inspection, etc; time:-																					
	(F-3G)	-	CF-3 Forests - Use F31 below																					
	(F-3H)	-	CF-5 Forests - Under a standard of 2 range inspections per season time is provided in the grazing converting factors for two trips, plus, which will tie-in partly with and provide part of the travel time for one or two of the monthly guard inspection trips and with showing guards their country. The duplicate travel otherwise involved should be eliminated.	Use only even or half months throughout for CF-5. For periods 5 days or more over the even or half months extend to the next even or half month. - For Step 1 use ¼ of set-up for adjacent months for ½ month. Steps 2 and 3 for 2 month seasons reduce by ⅓ of cut for 3 month season for Steps 2 and 3 " " " " " 2⅓ " " " " ⅓ " " " " " " " " " " "																				
	(F-3I)	-	For 3 month fire season on CF-5 districts - 1 guard inspection trip will be on travel in connection with range inspection. Reduce the gross guard time as follows:																					
			No. of Guards used	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
			If less than 50 Acres per head reduce by - days -	1	1½	2	2½	3	3½	4	4	4½	5	5	6	6	6	7	7	8	8	8	9	For 3 months fire season
			If with 50 - 100 " " " " " "	1	1¼	1⅓	2	2½	3	3¼	3½	3¾	4	4¼	4½	5	5¼	5½	6	6¼	6½	7	7½	
			If 100 - 200 " " " " " "	½	½	¾	1	1	1½	2	2	3	3	3	4	4	4	4	5	4	5	6	6	
			If 200 - 400 " " " " " "	-	-	-	-	1	1	1	1	1½	1½	2	2½	2½	2½	2½	3	3½	3½	4	4½	
			If over 400 " " " disregard																					
	(F-3J)	-	For 4 month Fire Season - One and part of second range inspection involved:																					
			If less than 50A per head reduce by days	1½	2	3	4	4½	5	6	6	7	7½	8	9	9	9½	10	11	12	12	12	13	
			If with 50 - 100A " " " " "	1½	1½	2	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	10½	11	For 4 months fire season
			If with 100 - 200A" " " " "	½	1	1	1½	2	2½	3	3	3½	3½	4½	5	6	6	6	7	7	7½	8½	9	
			If with 200 - 400A" " " " "	-	-	-	1	1½	1½	2	2	2	2½	2½	3	3½	3½	4	4½	5	6	7	7½	
			If over 400A " " disregard																					

(F-3K) - For 5 months Fire Season (Both range inspections will be involved
If less than 50A per head reduce
If with 50 - 100A " " "
If with 100 - 200A" " "
If with 200 - 400A" " "
If over 400A " " disregard

Double the reductions shown for the 3 months fire season.

* The ranger will usually attend a camp on another District if he has but 1-3 guards - setting up camp is not then his job.

STEP 3 (F-3L) - Effect of Use of Auto on time needs for guard station inspections:

(F-3M) - If less than 12% of the guard stations are reached by car make no reduction and disregard all below. When guard inspection trips are tied in with grazing, trips will not be by auto - no deduction is therefore made for auto travel on those trips. That is no reduction for 1 trip of 3 in 3 month fire seasons - 2 trips or parts of 2 trips in 4 and 5 month fire seasons. The remaining trips may be made wholly or in part by car and deduction is made for the faster travel as follows:

(F-3N) If Stocked Less Than 400 Acres Per Head

(F-3N1) - Then for CF-3 Forests If 30% of the guard stations (omit hdqr. guard) can be reached by car deduct 2½ hours for each guard station used above
(For travel on 2 If 50% " " " " " " " " " " 4 " " " " " " "
of 3 trips) " 100% " " " " " " " " " " 8 " " " " " " "
(This is used on car travel as 5 times faster than horse ie; for 100% above horse travel is 10 hrs; for car travel is 2 hrs.)

(F-3N2) - Then for CF-5 Forests - with 3 month fire season - use (F-3N1) above (Is travel on 2 of 3 trips)

(F-3N3) - With 4 month fire season: If 30% can be reached by car deduct 3 hours for each guard station
(For travel on 2½ 4 trips) If 50% " " " " " " 5 " " " " "
If 100% " " " " " " 10 " " " " "

(F-3N4) - With 5 month fire season: If 30% " " " " " " 4 " " " " "
(For travel on 3 of 5 trips) 50% " " " " " " 6 " " " " "
If 100% " " " " " " 12 " " " " "

(F-30) If Stocked With More Than 400 Acres Per Head (No deductions have been made a/c grazing)

(F-301) - Then CF-3 Forests. If 30% can be reached by car deduct 4 hours for each guard station used above
(Travel on part of all 3 trips) If 50% can be reached by car deduct 6 hours for each guard station used above
" 100% " " " " " 12 " " " " " " "

(F-302) - Then for CF-5 Forests with 3 months fire season - use (F-301) above

(F-303) - With 4 months fire season: If 30% can be reached by car deduct 5 hours for each guard station
(Travel on part of all 4 trips) If 50% can be reached by car deduct 8 hours for each guard station
100% 16

(F-304) - With 5 months fire season If 30% " " " " " " 6 " " " " "
(Travel on part If 50% " " " " " " 10 " " " " "
of all 5 trips) If 100% " " " " " " 20 " " " " "

EWL 2/4/30

Sample National Forest Plan—Appendix

SAMPLE.—*Region 3 computed (index) weights by forests and ranger districts, 1928 basis*

(129 days in peak season)

Forest	Prescott CF–5						Santa Fe CF–5								Sitgreaves CF–5				
Ranger district	Skull Valley	Prescott	Crown King	Jerome	Bloody Basin	Total	Chama	Colonias	Jemez River	Las Vegas	Pecos	Rio Grande	Tesuque	Total	Lakeside	Pinedale	Heber	Chevalon	Total
Items:																			
Sales	4	13	1	23	1	42	5	41	5	3	47	40	16	157	38	3	1	3	45
Other sales	2	2	1	3	1	9	2	5	2	1	4	5	3	22	5	1	1	1	8
Grazing	120	35	42	59	61	317	81	33	55	13	38	34	16	270	38	49	63	47	197
Impt.'s and crews	19	8	9	8	10	54	17	11	14	6	12	9	11	80	9	13	14	11	47
Fire suppression	1	25	7	11	1	45	11	6	17	10	3	14	4	65	20	25	26	12	83
Guard stations	0	6	4	3	0	13	10	0	9	6	0	6	0	31	6	6	5	11	28
Other fire and P. 4	2	3	1	4	1	11	3	1	3	4	3	2	4	20	3	2	1	2	8
Visitors, trespass, etc	4	5	1	3	1	14	6	3	6	1	7	4	6	33	0	1	2	0	3
L. uses	9	6	5	5	6	31	3	1	5	3	4	4	1	21	8	10	4	2	24
Acquisition exchange	0	0	0	0	0	0	0	0	2	0	3	2	2	9	0	0	0	0	0
Other L. and camps	0	1	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0
Miscel. and nonfield prorate	27	16	11	19	15	88	21	15	18	10	18	21	9	112	19	16	18	17	70
Index total	188	120	82	138	97	625	159	116	137	58	140	141	72	823	146	126	135	106	513
Reported manning, years	1 7/12	1	1	1 3/12	1 4/12	5 7/12	1 2/12	1	1 3/12	1	1	1	1	7 4/12	1 1/12	1	2	1	4 6/12
Indicated manning, years (index total÷129)						4.8								6.4					4.0
Area in M	457	139	163	215	213		370	188	238	85	205	158	150		154	248	275	207	

Forest	Tonto CF–5									Tusayan CF–5							
Ranger district	Pine	Payson	Pleasant Valley	Sierra Ancha	Salt River	Mazatzal	Verde	Cave Creek	Total	Verde	Williams	Chalender	Spring Valley	Amita Moqui	Total		
Items:																	
Sales	8	12	13	7	3	1	1	0	45	14	9	22	3	1	49		
Other sales	2	2	2	2	1	1	1	1	12	2	2	3	1	1	9		
Grazing	90	73	67	52	58	61	87	119	607	74	66	60	59	113	372		
Impt's and crews	15	13	12	14	14	14	15	14	111	11	12	11	10	20	64		
Fire suppression	8	16	25	14	0	5	0	1	69	1	23	29	19	3	75		
Guard stations	4	6	6	6	0	0	0	0	22	0	10	5	6	3	24		
Other fire and P. 4	1	2	1	1	5	1	4	5	20	1	3	1	1	2	8		
Visitors, trespass, etc	4	8	8	5	7	3	4	6	45	2	5	4	2	1	14		
L. uses	6	10	7	8	8	3	5	9	56	3	7	5	4	4	23		
Acquisition exchange	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2		
Other L. and camps	0	1	0	1	0	0	0	0	2	0	0	0	0	0	0		
Miscel. and nonfield prorate	21	21	21	20	14	13	20	26	156	16	21	21	16	24	98		
Index total	159	164	162	130	110	102	137	181	1,145	124	160	161	121	172	738		
Reported manning, years	1	1 9/12	1 9/12	1	1	1	1	1	8 9/12	1	1 5/12	1	1 2/12	1	5 1/12		
Indicated manning, years (index total÷78 or 129									8.9						5.7		
Area in M	320	300	256	254	290	268	377	393		253	253	240	222	543			

Figures in parentheses are changes to 1929 manning.

STEP 10. OBTAINING THE DESIRED QUALITY OF WORK—INSPECTION

Job-load analysis determines the time and methods needed to do the work properly; i. e., to the proper standard of quality. *It does not assure that quality will be obtained.* That is an entirely different subject, involving inherent ability, education, training, actual inspection, and other factors, which can not be treated within the space limitations of this publication. The distinction, however, should always be borne in mind. Job analysis, in itself, does not assure quality.

Follow-up, as discussed on page 53, is a valuable aid in this respect, but without adequate and actual inspection of the work itself to control quality output, the aim of job analysis and planning is pretty well lost.

"A standard is neither established nor maintained by the simple process of publishing the specifications which define it. Because individuals vary in their capacities to understand specifications and to acquire new patterns of habit, continuous inspection of efforts, as manifested in means, methods, and results, and explanation and correction of errors, are essential to that educational process which constitutes the establishment of standards. Also, individuals vary in their capacities to maintain standards * * *. This makes necessary a system of continuous reminders * * * based upon facts revealed by a continuous inspection of facilities and performances" (*26, p. 377*).

REVISIONS

With a well-made analysis available, the job of keeping it up to date and improving it should not be difficult, unless there is a decided change in some feature of the work. This is mentioned because bringing an analysis into shape the first time is so tedious and time consuming that to think of repeating it frequently and in detail is discouraging to the busy executive. Nevertheless, it is of major importance that the job descriptions and other parts of an analysis should never be thought of as completed or static. To merit the respect which its conscientious use demands, it must be vital and growing, always under investigation, revision, and improvement. If the analysis has been properly made the subsequent changes in standards of quality, of methods, and of time, as well as the quantity figures, will, over a limited period, ordinarily be so few in number that they may be inserted in the part of the analysis affected without greatly disrupting the remainder of the material. After this patching has been done for several years, possibly three years, or if at any time a major change in the volume of work or in the policies controlling it takes place, a complete revision of the analysis should be made. In the meantime, the plans of work in part 3 and the job lists in part 2 should be reconsidered and balanced annually. This should be supplemented by such monthly revisions of the plans as changing conditions require.

As may be judged from the following (*15, p. 6–7*), the same general idea regarding revision has apparently been developed from experience in other lines of work: "An organization can not remain static and continue in business. In fact, it seems that the rate of change in method and process is increasing rather than diminishing. The introduction of labor-saving equipment, the addition of new products,

discontinuance of others, new methods of manufacture, and new methods of marketing and distribution, mean different sets of records and different methods of handling the work. Fluctuations in quantity of business * * * mean that the work in most offices is in constant state of flux. This might lead some to feel that a job analysis would not be worth while due to the short time that it would remain up to date. Quite the contrary is true, however, since analysis may contribute materially to the organization of the work. When a thorough analysis of the department has been made and complete sets of job specifications drawn up, subsequent analyses take a relatively short time unless a complete change has taken place. Job analysis should not be undertaken in the beginning unless the management is willing to see it through.

"The question then comes as to how often these specifications should be revised. Where * * * salary considerations are not more frequent than once a year, an annual revision of job specifications should suffice, even though there may be considerable change during that time.

"At the time of hiring or a proposed salary increase, a particular job specification can be brought up to date. The simplest method of keeping job specifications up to date seems to be to have the department head or supervisor go over the most recent set of position description sheets for his department, making such changes as are necessary. In most instances for departments of not more than 100 employees, a total not to exceed one day a year is sufficient for the department head to make this review. After the department head has had an opportunity to study the original specifications and make the necessary changes, the analyst reviews the changes * * *.

"Not all departments need be revised at the same time. In our organization, for example, the original analysis and classification extended pretty well throughout the year. We attempt to bring job specifications for a given department up to date on the anniversary of the original analysis for that department. In this way the work is distributed throughout the year, and, so far, has been handled without any additions to the staff. The retyping of job specifications is done when typists are free. If, when it is time to revise the specifications, a particular department is undergoing a period of change, the analysis is deferred until such time as conditions are more settled."

RESULTS

If the truest test of capacity is performance on the job, then the best check on the job analysis and planning practice is the extent to which it meets the 22 problems and aims outlined on pages 9 to 13. To this end it might be desirable to repeat all of these points and comment in detail on the results obtained in connection with them. However, to those who are now acquainted with the job-load analysis and planning procedure no examples or detailed discussions should be needed to show that when properly used it is a logical, common sense way to attack the problems in question. Certainly a comprehensive picture of the work should be obtained before locating expensive structures to be used in administration; in determining the balance in job load between funds available, as well as between the individuals who must handle the work and the salaries paid them; in providing

for an equitable division of available time between different activities; in fixing the definite needs for training; in finding out whether funds can be released for development work; in getting down in black and white and thus opening to challenge all of the practices involved in the handling of any position. This is likewise true of many of the general problems included in the list. A few specific examples of results so far obtained may, however, help to complete the picture.

COMPARISON OF PAST ACTUAL WORKING TIME WITH THE PROPER NEEDS OF A POSITION AS DETERMINED BY JOB-LOAD ANALYSIS

While the cases given below may be extreme, they serve to illustrate the effect which plans based on analysis have on practically all administrative positions in the grades which have so far been studied. The men concerned in these cases were executives of ordinary skill and capacity for hard work, but they lacked an adequate method for grasping and dealing with the complexities of their work.

Case 1.—A very competent, experienced, and hard-working junior forester in charge of a district with 2 sawmills, 2 lookout stations, an average of 9 fires annually, 3,100 cattle and 34,000 sheep under permit, a summer-home colony and other land-use activities, as well as a driveway problem and miscellaneous duties.

Activity	Days in peak season	
	Past actual	Job needs as determined by analysis
Nonfield	13	24
Field:		
Timber management	34	36
Range management	59	75
Road, trails, structures	10	12
All fire activities	22	21
Land uses	9	11
Number days worked	147	179
Number of work days available	129	129
Sundays and holidays worked	18	0

The past actual in this case does not show the complete picture of overtime devoted to keeping things going well in the field, or night work done to keep abreast of the office job. The analysis definitely shows the need for relief from the overload, if the work is to be well done by a competent man without danger of breaking down.

Case 2.—A bright young junior forester relatively new to his position in charge of a ranger district, on which, in addition to many other activities, 2 small sawmills and 3 minor product operations were handled, and 4,000 cattle and 15,000 sheep were grazed under permit.

Activity	Past actual	Job needs as determined by analysis
	Days and hours	*Days and hours*
Nonfield-office	146.1	80.5
Field:		
Timber management	54.5	99.2
Range management	40.7	42.1
Roads, trails, etc	16.2	4.2
Fire-control activities	5.5	8.1
Land-use management	3.7	9.3
Miscellaneous	1.5	1.5
Off district	16.0	----------
Total number of days	285.0	245.3
Leave and holidays taken	80.0	All.

The foregoing shows that the better usage in the analysis column is due to less nonfield (including work on the ranger station and grounds) and less road and trail work. It does not show the poor seasonal distribution of the past actual time; that by August 10 the officer had not as yet inspected or visited some 50 per cent of his district, although it was fully stocked with animals grazing under permit; and that in June, for example, which is probably the peak month, 14 days were spent at the headquarters and only 6.4 days in the field on timber and range management duties. The analysis when made provided for doing most of the nonfield work heretofore done in June, before the peak season arrived and for delegating to a handy man the nonranger-caliber jobs. It also found that the proper handling of the position called for 13.4 days in the field during this month. As is indicated by this last figure, the analysis found that the job load on the district was so light that additional territory should be combined with it. It should be noted that an inspection of conditions on the unit showed that some change in time usage was needed and that better training, especially in range management, a subject which was relatively new to this junior forester, should have been given him.

Case 3.—A highly capable, experienced, and willing ranger in charge of a district with little timber-sale work, 5 fireguard stations, an average of 17 fires annually, 100 cattle and 17,000 sheep under permit and quite a recreation business in addition to miscellaneous other duties.

Activity	Past actual	Job needs as determined by analysis
	Days and hours	*Days and hours*
Nonfield	----------	----------
Field:		
Timber management	2.1	3.6
Range management	16.1	41.4
Trails, telephone, etc	110.2	48.5
All fire activities	13.0	31.5
Land uses	1.2	1.4

That trail and telephone work was this man's hobby is evident. The condition of the grazing allotments on the district may also be judged from the extent to which the range management work was slighted.

Case 4.—

Activity	Past actual	Plan based on analysis
	Days and hours	*Days and hours*
Cruising and appraising	16. 4	32
Woods inspection	8. 5	21. 4
Scaling	43	47

Case 5.—

Activity	Past actual	Plan based on analysis
	Days	*Days*
Timber management	13	42
Land uses and recreation	17	38

Case 6.—The analysis found that it should not be expected that the supervisory work on this forest could be handled properly by one executive, and that the specialist, then on project work there, should be assigned to the staff and devote part of his time to caring for the overload of recurrent supervisory duties.

Case 7.—The opposite of case 6. The volume of recurrent work was shown to be such that the assistant supervisor should devote practically all of his time to development work, or relieve the supervisor of recurrent work so that he could participate in desired research and other creative projects.

Case 8.—On a forest with a 4-man supervisory force the analysis showed that by properly delegating some tasks, by avoiding duplication of work, and by thorough planning, one man could be dispensed with and the others could and should complete several major development projects, timber management plans, land acquisition, recreation plans, etc., that had been on the calendar of uncompleted work for some time.

The humanitarian side of the analysis procedure, and the rehabilitating effect that the plans based on it have on men who have fallen into a rut, is illustrated in the case of a certain officer who was potentially capable but whose work was found to be unsatisfactory. Instead of replacing him, as would ordinarily have been done, the requirements of his job were analyzed, trip plans prepared, and a full understanding reached as to what the work required. Subsequent inspection found that the plans were being followed and the work done satisfactorily. In another instance the follow-up found repeatedly that the plans were not being met, and since there were no justifiable reasons it was evident that the man was not qualified to continue in his position.

The workability of a well-made plan, as stated several times heretofore, depends in major part on the intelligent, considerate, and analytical interest shown in it by the official immediately superior to the one using the plan. That well-made plans are workable has now been demonstrated on many forests. A specific example will serve

as an illustration. An official in charge of a ranger district was unexpectedly met on the first day of a scheduled trip period and accompanied while he attended to guard training and installation, trail and telephone-crew inspection and supervision, trail location, range inspection, special-use inspection, and other duties, involving a trip with a pack string and an unusual sequence of unexpecteds—horses lost in the mornings, a caved-in trail resulting in the animals rolling off the grade, rain almost every day, and so on—and still at the end of the trip the party was half a day ahead of the schedule, which had been made the preceding winter. Later reports showed that similar success was obtained with other sections of the plan during the balance of the season. And probably the best of it was the supervisor's statement, that this old-time officer was not accustomed to making clean-up trips of this sort, but they were now made because the schedule gave him something to shoot at, put the spirit of competition into the way he went at his work.

RECOGNITION AND EVALUATION OF ACTIVITIES

The success of job analysis and planning in meeting another of the 22 listed problems has been expressed by a major executive in charge of one of the main branches of Forest Service work, as follows: "The recognition accorded range management in the various administrative plans developed, analyses made, etc., gave it a permanent and rightful place in administration. It is no longer the orphan in forest administration, but occupies a dignified position among our activities. In line with according range management the proper place in administration, special attention was given to a more careful analysis of the problem."

As a matter of fact such statements should be expected concerning all activities since the analyses reflect the policies of the responsible branch officials to the extent that their policies, as approved by the general manager, have been clearly defined.

ECONOMIES IN ADMINISTRATION

The effect job analysis may have even on minor points, which in the aggregate keep a forester from forward-looking work, is shown in the following partial list of suggested economies in administration made by the regional forester, supervisor, and others while participating in the analysis of the Glenwood district on the Natural Bridge Forest in April, 1928:

Discontinue annual report on plantations.

Make special filing scheme for rangers so as to reduce the number of folders and guides by something like 50 per cent.

If possible discontinue grazing reports for certain districts.

Reduce amount of work on 350 letters of transmittal issued by ranger by printing in or stamping in most of the material.

Reduce the number of classes of tools so as to facilitate the making of the property inventory.

Discontinue issuing permits for the few "exempt" stock.

Obtain better timber-sale administration by directing the operators rather than being directed by them.

Discontinue or make optional the keeping of 621G cards.

Discontinue or make optional the keeping of improvement-allotment cards.

Discontinue, probably, the issuance of free-use permits.

Increase, if possible, the ranger's timber-sale authorization, since heavy salvage operations are needed on the district.

Discontinue beck and call scaling by establishing a frequency standard for scaling trips.

Avoid disputes with timber-sale operators by requiring more posting of timber-sale boundaries.

Consider the advisability of dropping from Form 820 the record of "number of logs."

Letters of transmittal for sawmill sales to be issued by the supervisor instead of by the ranger.

Discontinue or make optional the keeping of the card record for timber-sale payments.

Question the necessity for detailed cost distributions on expense accounts. Will probably provide a simpler prorating scheme. In this way, and by making other short cuts, reduce the time necessary to make out an expense account from three and one-half hours to a fraction of one hour.

By consideration of the method of handling and need for correspondence reduce the average number of nonfield days from something like 12 to about 6 per month.

Discontinue or make optional the keeping of a card record for property.

Simplify the method of surveying smaller fires.

Discontinue the use of large fireplaces on camp grounds.

Discontinue much interior-boundary posting.

Cut cost of acquisition examinations and reports in half by the use of local men instead of officials from Washington.

STANDARDS RAISED

The steps which were taken in the way *of raising* standards do not belong in the list of economies. A reference to the analysis will show, however, an increase in the frequency of woods inspections on the timber sales; a scheduling of the contacts with volunteer fire wardens under which there is less likelihood that these key men will be overlooked or not visited at the right time; participation in stock-inventory surveys on cut-over lands to a degree not attempted heretofore, and so on through many other activities.

QUALITY RESULTS

It is very much to the point to ask whether the quality of the work has held up or been improved with the economies in administration effected under job analysis and planning. For nonrecurrent work, the number of new projects which have been undertaken and completed with funds which otherwise would have been spent on administration shows that the answer is decidedly in the affirmative. For the recurrent routine duties, inspectors find that they are being well done and, as shown by the statement of one of the branch chiefs on page 72, important activities which formerly received only secondary attention, in many cases have now taken their "place in the sun."

The progress made in fire control, although it is hazardous to speak about such a thing, is another tangible "result" which shows that quality is being obtained regardless of the fact that an increase in the size of administrative units has in some cases resulted from the analyses; the funds so released having been used in major part for fire-control purposes. For years the objective in this activity has been to hold the acreage burned within the national forests as a whole to 0.1 per cent of their gross area. According to the records back to 1908 this has never been attained; in fact it has rarely been approached until during 1930, when it was attained for the first time. The season was not the most difficult, but it was decidedly not an easy season, there having been in excess of 1,000 more fires in 1930 than in the average year in the past decade. Recent increases in appropriations have been a great help. Nevertheless, of immeasurably great help also have been the benefits from the years of widespread efforts to strengthen the various features of executive management. Job-load analysis and its accompanying technics are a logical development and outgrowth of such efforts. It is appreciated that one year means little in fire records over a long period. The use of this point is justified, however, when the consistent drop in the area-burned curve is considered.

The various examples mentioned in the preceding pages, although representative of several classes of results, are not as striking as those which show the financial results, although the former in the aggregate and in the years to come, will be much more important. Results in definite figures are, however, more easily recognized and appreciated. Unfortunately it is difficult to segregate actions influenced by the analyses from those which would have taken place without them. Consolidations of ranger districts and national forests, for example, have been going on since the creation of the national forests with the *possibilities decreasing*, of course, each time such mergers were made. This historical fact should therefore be borne in mind in considering that since the job-load analysis work was undertaken some 70 ranger districts, the exact number depending on the dates included in the comparison, have been eliminated through combinations with other districts. Funds have thus been made available for urgently needed development work including resource surveys of various classes—timber, range, acquisition, game, recreation, etc.; for employment of high-grade specialists; for promotions, which normally have had to be financed entirely from savings; and for other necessary and desirable steps, of which the still-unsolved problem of fire control has been the greatest beneficiary. A recent comprehensive study of country not in the serious fire zone found that the best-balanced use of available funds called for a further reduction of 23 per cent in the number of ranger districts in this particular region and the diversion of the funds so released primarily to the fire sections.

The total thus diverted to the mass of unsolved problems which still face the organization will represent possibly a quarter of a million dollars annually.

Misunderstandings regarding this point have led to the question: Will not the reduction in personnel occasioned by these changes seriously harm the good results previously obtained in forestry? The answer is decidedly, No. There has been no reduction in man power in forestry but a diversion of man power to higher-quality and more urgent forestry needs.

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INTANGIBLES—QUALITY VERSUS QUANTITY

The aim of the job-weighing feature of the analysis is to determine the time needed for a high average to first-class man to do the work with the desired degree of quality. If quality is not then attained it is usually due to weakness in that broad field which has to do with personnel selection, training, control, and other duties of management.

Proper use of the analysis method provides for attaining adequate quality. Moreover, it encourages the superadequate and exceptional performance, which then stands out so clearly that it demands reward. For example: The job of marking timber in two similar forests may involve the same number of trees, and the analyses as a result may show a similar job-load weight for this activity on both forests. Both jobs of marking as completed may be of adequate quality, but in one case the forester does a finer job within the same time required by the other man, who does his work satisfactorily and within the time provided in the analysis. Or the first man does an adequate marking so much quicker than his neighbor that he has time available to make a volume table based on local studies. Either result on the part of the first man should be classed as "superadequate and exceptional," and should merit consideration in the form of special reward.

Intangibles, if they do not fade away when analyzed, often, if not usually, may be most easily expressed in terms of jobs. Clear-visioned analysis and expression in the form of jobs is often necessary to bring out intangibles so that their values are utilized or recognized. For example: Two otherwise comparable forests have the same number of potential fire cooperators to be interviewed. In one case the cooperators are strongly sympathetic and receptive, while in the other they are recalcitrant or wavering in their interest. A ranger with a certain type of personality may in an intangible manner get as good results in the same time from the recalcitrant group, as another man would with the sympathetic group. However, it is evident that for the same first-class man one group of cooperators is more difficult to handle than the other. This would be expressed in the analysis by providing in connection with the recalcitrant group for more jobs—motion-picture shows, more interviews, news items, sitting on fences and whittling sticks, being present in the office available for conference—all of which are expressible in terms of time. To the extent then that the intangible quality, personality for example, obtains desirable superadequate or additional results within this normal time, the intangible should be recognized with proper rewards.

A further example: On two otherwise identical watersheds the grazing problems differ in intensity; those on the first area requiring more knowledge and greater qualifications on the part of the supervising official, than do the problems on the second area. As in the example cited above, the differences in difficulty of administration of these areas, for men of equal caliber—may be expressed in terms of jobs—more frequent inspections, more range-use planning, more local studies, and so on. The intangibles which may enter into such a situation would be in the personal qualities of the supervising officials and not inherent in the work itself.

COMPARING AND RATING POSITIONS

The foregoing brings out that the amount of time needed for qualified men to handle certain positions properly can be determined by analysis. It also shows that there should be a basic compensation for doing the work adequately, plus additional rewards for desirable superadequate or additional work. When it comes to comparing positions, however, quality requirements—caliber—of work, needless to say, are very important. There is little difficulty in segregating positions into broad classes—forest supervisors, district rangers, etc. Within these classes further subdivisions, by relatively broad groups of positions, are clearly called for by the sum of the caliber plus quantity of work involved, and by policies bearing upon it. Thus, two ranger positions may each have the same number of days of work, one supervising trail construction, the other handling important sales. The "quantity" is the same but the caliber of the sales work may be rated so much higher than that of supervising trail construction that the second position should be placed in a higher classification than the first. Smaller subdivisions, however, are not ordinarily justified on the basis of quality demands because of the give and take in such requirements between activities and their changing occurrence. Within these broad classes the weighing of the jobs as to quantity will go a very long away in getting at just comparisons.

The point may still not be clear and the question asked: Although it may be that intangibles are usually expressible in terms of jobs, are there not conditions where certain personal qualities are necessary in order to perform the work adequately * * * to devote an appreciable amount of time to appearing before legislatures, for example? The answer, as before, is that the volume of work is expressible in terms of jobs for qualified men—those having the necessary personal characteristics.

It should be noted that the statements regarding intangibles apply to the actual analysis of each position and should not be confused with computed job-load weights. This is another subject in which averages applicable to groups of positions rather than to individual positions are used.[8]

JOB ANALYSIS AND ACCOUNTING

Carried to a point beyond which it has so far been used in the studies on which this publication is based, job-load analysis very logically ties in with good cost accounting. The analysis determines proper time needs. These in turn may be converted with little difficulty into standard costs. The accountants, and through them the executives, then have a "normal" cost against which actual costs may be compared currently. It is also recognized that the best budgeting can not be done effectively until standard jobs and normal costs have been established. With this done, the volume of work i. e. the sum of the M feet b. m. to be cut, the area to be planted, the number of guards, the number of stock, and other variables, gives a basis for financing.

The control of operations through cost accounting is a subject in itself of major importance, but only its possibilities will be mentioned

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[8] LOVERIDGE, E. W. CORRELATING STANDARDS AND CONVERTING FACTORS FOR DETERMINING INDEX JOB LOAD WEIGHTS, 1930. (Unpublished.)

here. A more complete picture of it may be obtained from the United States Chamber of Commerce Bulletin, Cost Accounting Through the Use of Standards (*31*).

EFFECT ON THE PERSONNEL

Throughout the studies particular pains have been taken to show that an analysis and plan will help the forester in organizing his efforts. It is not to be considered at all as a means of "badgering" the forester or killing his initiative, or mechanizing him. True, it is expected that as a result of this analysis and detailed plan, he will succeed in getting more and better work done, but that will not be through making his job harder, but through making it easier. It should give him a much clearer and more definite picture of just what his job is, what is expected of him, and enable him to direct his efforts in ways that will result in greater accomplishment. Analysis will show the cause for any necessary "high pressure" under which the executive may have been working and provide a substantial basis for having it removed.

The manner in which the studies have been taken by the men affected, has in general varied with their degree of comprehension of the proper methods and the underlying policies. Statutory obstacles to making all of the salary adjustments merited by increased responsibilities have hindered, to some extent, the use of the monetary incentive which is commonly used in private work. Increased knowledge and use of the analyses and plans have, however, made them increasingly well appreciated, and it is expected that their popularity will increase as additional studies provide material for improving them.

Although it is appreciated that testimonials may be obtained favoring almost any nostrum or panacea, it is believed that the consensus of untrammeled opinion was expressed in a discussion (*18*) by field men of this subject, after it had been under local development and trial for four years, as follows: "With the formulation of better * * * plans of work during the past few years it has been unnecessary to centralize as much of the responsibility in the supervisor's office as formerly. Initiative * * * will necessarily vary with the individual and with the type of leadership, but I would say that present conditions are favorable to the promotion rather than the destruction of these qualities" (*18, p. 2*).

"A lot of the 'kick-back' that has resulted from job analysis, organization analysis, reorganization and budgeting (if plans ahead and accomplishment standards may be termed as budgeting) has simply been the reaction from thoughts forced into unfamiliar channels. The new vision of the job does not square with the old concept. Birth must be given to new thought and the job must be visualized in the terms of the new possibilities opened up as the result of activity analysis" (*18, p. 3*).

According to another forest supervisor, "The passing of the old 'hip-hip-hooray' days of the Forest Service has been mistaken by many for a loss of esprit de corps but I do not believe that this is justified. The expanding activities and increasing importance of the national forests in the life of local communities has opened up opportunities for initiative that were undreamed of 20 years ago and we have been able to meet these demands only through standardization and improved methods of conducting the more routine types of recurrent work" (*18, p. 5*).

Another supervisor believes "the local esprit de corps is as good as ever seen in any section of the organization in over 20 years experience." And he feels that "to the work done in analyses and planning must go the credit of bringing the really important features of our respective jobs into sharper relief than ever before" (*18, p. 6*). Another said, " * * * we have plenty of latitude to administer, but first we must prove by results that we can execute. The trend is toward executive rather than administrative work—toward scientific measurement of results rather than guess" (*17, p. 10*).

From another section of the country comes the statement that—"The work plans, which some feel have hampered them in initiative, etc., are merely an aid to them in covering more ground systematically and with less effort. * * * He has and always will have a big part in their formation and it is really getting down on paper in a logical manner the various ideas floating around in his brain on how the districts should be handled. * * * Standards have not, I believe, been made with any idea of restricting initiative or cutting down esprit de corps but rather to promote this by giving out the experiences of others as to better ways of doing things, quicker action, and to the end that more work will be accomplished and better than by old antiquated methods or haphazard procedure" (*18, p. 22*).

In like vein is the opinion that "initiative is increasing which is natural with a clear definition of objectives, obligations, and standards. Vague objectives and standards which are subject to change by each passing forest officer do not induce initiative in the field men." (*18, p. 26*). The present trends are to employ "scientific methods for studying our work and methods" and * * * "to vary policy and action to fit local conditions rather than to standardize it for the whole United States." (*18, p. 27.*)

INITIATIVE AND FREEDOM—MECHANIZATION AND THE HUMAN ELEMENT

An attempt has been made in the foregoing pages to discuss in their proper context some of the controversial points which arise in connection with the subject of job-load analysis and planning. In this manner such factors as unforseens, intangibles, flexibility, unexpecteds, obtaining quality in results, esprit de corps, reflection, development work, mechanization, and others have been discussed. The effect on initiative and the extent to which the plans deprive individuals of their freedom of action have also been mentioned.

Thus, Taylor (*32, p. 1466–1467*) in commenting on initiative and individuality said: "Now, I think you will agree with me as to who this finest and highest-class mechanic in the world is. So far as I know there will be no question about him, for we all agree that the highest-class mechanic in the world is the modern surgeon. He is the man who combines the greatest manual dexterity and skill with the largest amount of intellectual attainment of any trade that I know of—the modern surgeon.

"Now, the modern surgeon applied the principles of scientific management to his profession and to the training of the younger surgeons long before I was born—long before the principles of scientific management were ever dreamed of in the ordinary mechanical arts. Let us see how this man trains the young men who come under him. I

do not believe that anyone would have an idea that the modern surgeon would say to young doctors who come into the hospital or who come under him to learn the trade of surgeon—I do not think the surgeon would say anything of this kind: 'Now, boys, what I want, of all things, is your initiative; what I want, of all things, is your individuality and your personal inventiveness.'

"I do not think anyone for an instant would dream that a surgeon would say to his young men, for instance: 'Now, young men, when we are amputating a leg, for instance, and we come down to the bone, we older surgeons are in the habit of using a saw, and for that purpose we take this particular saw that I am holding before you. We hold it in just this way, and we use it in just that way. But, young men, what we want, of all things, is your initiative. Don't be hampered by any of the prejudices of the older surgeons. What we want is your initiative, your individuality. If you prefer a hatchet or an ax to cut off the bone, why chop away, chop away!' Would this be what the modern surgeon would tell his apprentices? Not on your life! But he says: 'Now, young men, we want your initiative; yes. But we want your initiative, your inventive faculty to work upward and not downward, and until you have learned how to use the best implements that have been developed in the surgical art during the past hundred years and which are the evolution of the minds of trained men all over the world; until you have learned how to use every instrument that has been developed through years of evolution and which is now recognized as the best of its kind in the surgical art, we won't allow you to use an iota of ingenuity, an iota of initiative. First learn to use the instruments which have been shown by experience to be the best in the surgical art and to use them in the exact way which we will show you, and then when you have risen up to the highest knowledge in the surgical art, then invent, but, for God's sake, invent upward, not downward. Do not reinvent implements and methods abandoned many years ago.'"

It would, however, be presumptous to attempt to speak authoritatively regarding initiative, freedom, mechanization, and similar subjects, on the basis of the relatively brief experience which has been had with job-load analyses and their related plans in forest administration. Many indications have developed, and the logic of the procedure from all angles appears to be sound. Nevertheless, it seems much better at this stage to use the words of those who are recognized authorities in management and human engineering, in reply to these questions (*5, p. 63*):

According to Dewey, "freedom is achieved through the exercise of intelligence, whereas the less discriminating of his disciples understand him to mean that intelligence is achieved through the exercise of freedom. Taken in this latter sense, freedom means the absence of external restriction; and it seems to be taken for granted that this kind of freedom leads automatically to effective, disciplined thinking, despite the warning of William James that the defenselessness of children against external stimuli, which 'makes the child seem to belong less to himself than to every object which happens to catch his notice, is the first thing which the teacher must overcome. It never is overcome in some people, whose work, to the end of life, gets done in the interstices of their mind wandering.' * * * The other meaning of freedom centers precisely in the ability to go

through with an undertaking by the discovery of appropriate means, by the surmounting of obstacles, and by the modification of the original plan or conception in the light of new facts. This calls both for sustained effort in the presence of distractions and for the exercise of discrimination and constructive imagination—in short, for real thinking. It may be added that if we may trust the example of scientific thinking, the possession of a body of scientifically organized matter is of inestimable value, not only as a resource in later life but as a basis for present thinking. Where such subject matter is absent, we rely less on thinking than on guessing and more or less random experimenting."

In terms of Dewey's conception of freedom it is not at all evident that there is no place for compulsion or prescription. Any device is justified if it actually promotes thinking.

Dewey (quoted in Scientific Management in American Industry, *p. 112*) has said also: "Why is it not universally recognized that an end is a device of intelligence in guiding action, instrumental to freeing and harmonizing troubled and divided tendencies? * * * Men don't shoot because targets exist, but they set up targets in order that throwing and shooting may be more effective and significant."

"Cooperative effort in obedience to the laws of the situation destroy the imaginary absolute individual independence accepted as desirable by the older point of view, but it creates a compensating individual freedom not realized under conditions of absolute independence. The price of effective cooperation is adjustment and the price of adjustment is apparent diminution of independence. But independence without the law is more restrictive in fact than adjustment under the law. Independence in cooperation without the law is an illusion, for the individual is subject to the arbitrary will of the persuasive, strong or tricky cooperator" (*25, p. 31*).

"Almost all the best suggestions for improvements [that come under scientific management] come from intelligent workmen who are (cooperating * * * with the management to accomplish the joint result * * * (*25, p. 30*). "The workmen have the same sort of freedom, and they have just the same opportunity, to enter into every experiment which is made in what constitutes a fair day's work that the management have. The making of joint experiments * * * has been universal in scientific management, or practically universal, and the results have been satisfactory to both sides. I wish to emphasize the fact that until results of these experiments are satisfactory to both sides, scientific management does not exist" (*25, p. 30–31*).

The same idea is repeated frequently by those who have studied and dealt with the subject. Thus H. G. Kenagy (*13, p. 23*) at the American Management Association Convention in 1927 said the principal point which came to his mind was this one thing: "Don't stifle the initiative of your management. It raises for me the very important problem of how far we can go in standardizing methods. My own feeling about it is simply this: When you have a large number of men doing a management job, you will always find a large number of routine repetitive elements, common factors, which have to be done over and over again day after day. In so far as those routine jobs are to be done, the chances are that there is one best

way to do each of those jobs, or at most a few good ways. If we can discover what these good methods are, standardize on them, and put them into practice, we can materially improve management and yet keep well away from the point where we stifle initiative. It seems to me that by introducing such techniques, we liberate the creative energy of management to solve the new problems which come along day after day.

"I like to think of job analysis as a method of establishing standard habits of work on common elements of jobs, thereby enabling us to rise above the drudgery of some of the things we have to do, and spend our creative energies handling new and more difficult problems as they arise. * * * I think you will find it is the highest type of manager who in the beginning objects to standardization in management methods, and yet it is always that man who, once he gets the principle, will introduce your plans most effectively and use them to rise higher in the organization." And Hopf (*13, p. 27*), in speaking of the aim to improve management through job analysis said:

"Everyone abhors instruments of precision; everyone abhors measurement. Initiative, of course, should be released, but I am somewhat tired of having people say we want men with initiative. That is not what they really mean—they mean they want men with initiative who do the right thing without being told, and that is an important distinction. The man with initiative who is right gets a pat on the back; but the man with initiative who is wrong gets something quite different. * * * I have the highest respect for freedom of action, for the release of productive energy, and for the removal of drudgery from the executive job. * * *

Regarding mechanization, the point of view of the French engineer H. Dubreuil, in his book, Robots or Men (reviewed by Brinkman (*6*)) written after having worked and lived with American workers, is interesting in its implications regarding the standardization of routine work. For example, he says that much of the repetitive work performed by workers on highly specialized operations enables many of these to do thinking of a type which would be impossible if they were forced to pursue work that required much strength and continuous thought on what to do next. He adds: "Who could say that the physical activity of Spinoza, polishing his lenses, did not help him to pursue his profound and original speculation"?

A highly desirable viewpoint is that of giving to the work all of the interest and zest of a game—targets set up, rules to follow, new technic to be developed, referees, scores, prizes, cooperation, and team work. Viewed in this light, properly made analyses and plans can be drab only to those in whom the interest in healthy competition has expired.

MORALE

The effect on morale in the forest organizations which have been reached by the job-analysis studies has been discussed from the viewpoint of the field men on pages 77 to 78. A concluding quotation, from a statement to them by the Forester, presents the thought of the management on this subject.

"I have no qualms that the intensive study provided by the project will be harmful to service morale. I shall be disappointed if the study and the follow-up from it do not improve morale. While morale is

the reflection of many factors, it is based in large measure upon the satisfaction which the individual gets out of his work, and the public service accomplished by it. Morale is not a forced quality, but a natural human one. If a member of the service, whether Forester or administrative guard, is distrubed by a conscientious administrative attempt to know what he is doing and the effectiveness with which he is doing it, I would not be so much concerned with the man's morale as with his ability to meet Forest Service requirements. Our present approach may not be a proper one. If it is not, we can change it. Whatever method is used may not be acceptable to all; but my guess is that the men who are producing the greatest results in service work will be those most sympathetic toward such analyses and attempts to spend our time and our money most effectively in the public interest."

ADDITIONAL PROPOSED USES

Although the work of a regional office or Washington office executive is vastly different from that of a district ranger or a forest supervisor, most of the benefits which accrue from job-load analysis to the district ranger or forest supervisor should accrue also to the regional or Washington executives. It is strongly suspected that *special* advantages and benefits would accrue to the regional and Washington men which play a relatively small part in the values resulting in the district ranger and forest-supervisor fields. Even if a regional or Washington executive spends more than half his time on nonrecurrent work there is nevertheless a considerable element of recurrent work. Getting this recurrent work properly in hand frees time and intellectual energy for creative or constructive work which would otherwise not be undertaken. Moreover, it is believed that nonrecurrent and constructive work may benefit greatly by the processes of job-load analysis and appropriate forms of planning and control.

Although the analyses and plans discussed in this bulletin have been based on the work to be done throughout the year, the principal emphasis has been on the peak-season requirements. It has been natural and inevitable that first and most intensive attention should be given to the job-load problem during this vital period. It seems inevitable, however, that sooner or later better analyzing and control of out-season work will follow and thus assure proper utilization of the enormous amount of time and intellectual energy available during these seasons.

CONCLUSION

At this point it should be emphasized again that the suggestions herein apply more to the technic of the job-load-analysis and planning than to the quality of thought that is used in the process. Given the inherent ability, skill in analysis and planning can come about only through practice and review, and well-thought-out comparisons with actual accomplishments past and future.

Failure in work charged to the effect of the job-load-analysis program will no doubt arise, but it will probably be found that the failures "have generally been failures of leadership in initiating and guarding its development, particularly order, rate, and the extent of development. Scientific management is not an inflexible system of

procedures which can be bought and installed like a boiler, but is something which is developed out of a harmony of desires and understandings within an organization through the guidance of competent leadership. 'We want along the line * * * not only men who can do what they are told to do, but men who can do things we would never think of ourselves. We want men who have enough interest, and education, and experience, and boldness to make positive contributions to the intelligence and vigor of the work.'" (Drury, as quoted by Cooke (*8, p. 7*).)

A further caution which is combined with a forecast, both of which coincide with the results of the studies here discussed, is given by Mitchell (*23, p. 242*) in his statement: "The executive should guard equally against two assumptions—that the whole process of devising and installing a mechanism for applying scientific principles to the management of his business can be completed satisfactorily in a few weeks or even a few months, and that the whole process must be completed before benefits in the way of economies will begin to accrue." In like vein Taylor, as quoted by Person (*25, p. 32*) said: "You can not persuade any set of men, employers, or employees to adopt the principles of scientific management immediately. I have always said that it takes a period of from two to five years * * *. Do not expect to get through with it for about five years, because you will not."

All of this shows the necessity for laying a good groundwork in preparation for the studies. Providing this has been done to any great extent through years of discussion and use of standards and plans, it is believed that an adequate comprehension of job analyzing and planning, which after all are only normal developments of these older devices, will come most easily and effectively through trial and development in actual use.

The whole field of job-load analysis and planning is admittedly still in a stage of development. Nevertheless, tremendous advance has been made in the technic, and research here has yielded excellent results. There is still room for study as to how such results can be applied in a way which will assure improved training, good will, and adherence to standards. Additional work is needed, and additional stress should be given to the selection, assignment, and training of persons for performance of the functions which the analyses show to be involved.

The job-weighing, planning, and correlating aspects of the analysis movement are so important that they may obscure its other deeper and more far-reaching purposes. Production engineering as it expresses itself in job analysis, clarification of purposes, formulation of standards, and the development of the whole technic of executive management should be considered as at least coordinate with the whole research effort to make forest soils more productive and increase the utility of forest products. It is immaterial whether the supply of wood is increased because research develops an improved silvicultural practice, or because job analysis leads to reduction in fire losses, or to more effective direction of human energy—the end result is the same. The two lines of effort are interdependent, of course, and production engineering should eagerly welcome critical comparison of its end results with the results of other lines of effort.

APPENDIX

The following studies are included as samples of methods which have been used in making job-load analyses and plans of work for district-ranger and forest-supervisor positions. Qualified occupants of these positions should have a professional training in forestry or considerable experience in land management. They should also have a considerable background of experience. For these reasons and because the major activities are covered by handbooks, guides, manuals, or other available instructions, the job descriptions do not include as great detail as is frequently found in job analyses in other lines of work.

It has been impracticable to include in a few sample studies all of the activities with which the rangers and supervisors on a large number of widely scattered forests have to deal. The standards which are shown are fairly recent ones, as locally interpreted, but both the standards and the analyses in which they are used are under constant development.

The accompanying samples, therefore, are illustrative of methods described in this publication rather than up-to-date and complete pictures of the positions involved or thoroughly satisfactory analyses and plans. Particularly are more detailed data on unit time needed.

The difficulty of printing in colors has made it advisable to omit the maps which are usually included in the appendix of each analysis.

Throughout the time set-ups the decimals should be figured as hours, with eight hours equivalent to one day, unless otherwise shown.

The symbol, X, shows that the performance of the work will be incidental to other work and will require no separate time allowance.

GLOSSARY OF ABBREVIATIONS

A. R---------- Assistant ranger.
C. & H------ Cattle and horses.
Const-------- Construction.
Coop--------- Cooperator.
D. F--------- Douglas fir.
D. R--------- District ranger.
E. A--------- Executive assistant.
E. & S------- Equipment and supplies.
F. & G------- Fish and game.
F. C--------- Fire chief.
F. E--------- Forest examiner.
F. F--------- Fire fighter.
F. L--------- Fire line.
F. M--------- Forest management.
F. O--------- Forest officer.
F. O. S------ Forest officer—scaler.
F. S--------- Forest supervisor.
G------------ Grazing.
Gd----------- Guard.
Gd. Sta------ Guard station.
G. I---------- General inspection.
G. R--------- Grazing ranger.
H. E--------- Homestead entry.
Impt's------- Improvements.
Insp---------- Inspection.
I. R---------- Improvement ranger.
J. F---------- Junior forester.
Jct----------- Junction.
L------------- Lands.
L. O--------- Lookout.
L .of T------ Letter of transmittal.
L. E---------- Law enforcement or land exchange.
M------------ 1,000 feet, board measure.
MM---------- 1,000,000 feet, board measure.
Maint-------- Maintenance.
M. C--------- Man-caused.
M. P. O------ Maintenance, personally owned.
M. P. O E--- Maintenance, personally owned equipment.
N. F---------- National forest.
N. R--------- Nonrecurrent.
O------------ Operation.
P. R--------- Branch of Public Relations.
R. D--------- Ranger district.
R. & T------- Roads and trails.
R. O--------- Regional office.
R. S--------- Ranger station.
S------------- Sales or forest management.
S. & G------- Sheep and goats.
S. O--------- Supervisor's office.
S. S---------- Supervisor.
S. St--------- Supervisor's staff.
St------------ Staff.
S. U--------- Special uses.
Tel----------- Telephone.
Uses--------- Special use permits.
W. Y. P------ Ponderosa pine.
Y. L---------- Yearlong.
( )-------- Time or item not included in totals to avoid duplication or because the entry is "subcaliber" work.

Time is expressed in days and hours, thus 4 days 3 hours is shown 4.3.

(Sample)

ADMINISTRATIVE PLAN

Composite District Composite National Forest
Part 1. The local standards for each job which can be foreseen.
Part 2. The job lists.
Part 3. The trip plans and schedules.

Foreword

This plan, prepared jointly by the supervisor and district ranger, establishes a basis for mutual appreciation of the ranger district job as a whole, and for the systematic performance of that job with the minimum of effort. Its successful accomplishment demands adherence to the trip plans, schedules, inclusive dates and the stated local standards of perfection and frequency, unless the exception is reasonably justifiable. Since these standards are fixed with the relative need of the whole district job in mind, to deviate from them by adding unnecessary refinements to certain tasks and slighting others, will usually result in poorly balanced performance.

A week in advance of each month the trip plan for that month will be reviewed and where major variations are clearly necessary, it will be modified, but with as few changes as practical. A copy of any such revised trip plan, involving major variations, will be sent to the supervisor a week before the beginning of the month concerned, for approval. Other justifiable variations may be made without previous approval. This includes the addition of minor miscellaneous small jobs previously unforeseen, which generally can and should be incorporated with the work previously set up.

In the event of justifiable interruptions later, such as nonscheduled jobs of higher priority or visits by superior officers which can not be welded in with the planned trips, the new work will be included and the less important scheduled work dropped to be later welded in, so far as possible, with other trips. Such adjustments must be based on careful judgment and limited to the clear-cut needs of the situation.

Good Pointers

(*a*) Push all possible unscheduled work out of the peak season.

(*b*) When a bad break in important trips threatens, such as an unavoidable scaling job, a request for help from the supervisor's office may avoid the break.

Follow-up.—The ranger will report to the supervisor at the end of each month on a duplicate copy of the trip plan, as instructed, and show the degree of success he attained during that month in following the plan.

Unless otherwise specified, all jobs listed are to be done by the ranger in charge or a qualified assistant. Annually, during the winter season, the plan will be revised, in conference, and trip schedules will be prepared for the following year. Through thoughtful consideration by the officers concerned and additional study of all the elements involved, the plan should be gradually perfected and become an increasingly valuable tool of administration.

Standards established and plan approved by
F. R. Mismo,
Forest Ranger.

Date: March 10, 1930

F. O. Otro,
Forest Supervisor.
R. F. General,
Acting Regional Forester.

(Sample)

ADMINISTRATIVE PLAN AND JOB-LOAD ANALYSIS

Composite Forest Western Country Composite Ranger District
Area 231,474 acres.
Major items of work include:
2 sawmills with average annual total cut of 1,000 board feet.
7,925 cattle. Season: June 16 to October 15.
28,630 sheep. Mostly June 1 to September 30; with 6 head of sheep equal to 1 head of cattle, 12,697 stock are on the district; with 5 head of sheep equal to 1 head of cattle, 13,647 stock are on the district.
Stocked at 19 gross surface acres per head; or on net usable range, 9 surface acres per head.
4 lookout-firemen.
Average of 12 fires—2 are class C.
Relatively small volume of recreation use.
Big game country.
For the peak season June 1 to August 31—
Number of work days available, 78. In analysis, 92 (18 per cent high).
For the peak season May 15 to October 15—
Number of work days available, 128. In analysis, 138 (8 per cent high).

Under present (March 10, 1930) working conditions the above indicated overload of from 8 to 18 per cent should be handled by details of qualified assistants. This is especially so in June and July, as shown in part 2. In addition, all of the inspections of sales in these months should, if practicable, be delegated to others as a further relief to the ranger.

Investigation should be made looking to a readjustment of the boundaries of the district with the Paisley district to the east. The Composite district is an excellent all-around one for training purposes. If a trainee is assigned here he will be able to give enough help to remove the present excessive demands of the work.

The analysis set-ups indicate an average annual direct cost of supervision on the district of (exclusive overhead and proratable items)—
40–47 cents per M cut on timber sales.
4–5 cents per head of "stock" (5 sheep=1 cow) under permit.
1.1 cents per A. within the district. (324.6 days.)

Form 576v

SAMPLE—JOB-LOAD ANALYSIS, PART 1

Forest Management

Composite forest
Composite ranger district.
Analysis made 1927-8-9 by F. R. M., F. O. O.

Objective: To carry out the provisions of the management plan for the Foothills Working Circle. (Primarily to renovate the stand as a basis for intensive management.) At costs not to exceed 50 cents per M cut

Major activities and their elements	Perfection and intensity	Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eights per month or trip							
					Nonfield		Field				Total	
							Job		Travel			
					Days	Hours	Days	Hours	Days	Hours	Days	Hours
Management plan	Has been prepared. No general revision until 1936.											
Growth data	Obtain additional growth data—increment borings and stump counts—on areas specified in the management plan. (80 per day) after Oct. 15.		200	Oct.	1	0	2	4			3	4
Budget	Check cutting budget semiannually.		2	Jan. Aug.		2						2
Cruising	Obtain data to correct the inventory by cruising an average of 2 sections a year. 20 % cruise.		640 A.	Nov.		1	4	0		2	4	3
	(1 crew at 160 A. a day.)		640 A.	Feb.		1	4	0		2	4	1
	Compile notes and enter in record. See also the development section.			Feb.	2	0					2	0
Timber sales	Sales to sawmills. There will ordinarily be 2 small mills operating on the district each cutting an average of 500 M a year.											
Appraisals	Sales will be anticipated in order to make the appraisals out of the peak of the field season. 1 appraisal. Usually 1 trip each year. Made by the ranger with advice and help as needed by the staff.		1 sale.									
	Check field data already available (100 A. per day) and make report.		500 M	Feb.	1	4	1	0		2	2	6
Cruising	See above under "management plan cruising." This work is completed.											

See p. 85 for Glossary of abbreviations.

Selling	The policy is not to push the timber sale business in advance of the market.										
	Show prospects over the area to be sold and explain requirements of the Service. 2 trips.	2	Apr.				4		4	1	0
Boundaries	Will usually be made to conform to topographic or cultural features. Where this is not feasible the boundaries will be clearly marked.										
	Small stretches posted while showing prospective purchasers the area.		Apr.		x				x		
Contracts and bonds.	Will be prepared in the supervisor's office.	1									
	EAST FOOTHILLS COMPARTMENT (SPRING GULCH SALE)										
	500 M cut a year D. F. and W. Y. P.										
Marking	To be done principally out of the peak season.	500 M									
	About half in the spring.	1 trip.	Apr.			2	1		2	2	3
	About half in the fall.	1 trip.	Nov.			2	1		2	2	3
	(350 trees average of 350 feet bm=120 M per day.)										
	Additional special order—and correction marking will be done while making "woods supervision" trips.						x		x		
Woods Supervision	On each trip to the operation (*see* Scaling etc. for frequency) and at least once per month during the cutting period visit the sale area and inspect the cutting, brush disposal, etc., done since the previous visit, and make follow-up of previous inspections.		Apr				1		x		1
			May.				1		x		1
			June.				1		x		1
			July.				1		x		1
			Aug.				1		x		1
			Sept.				1		x		1
			Oct.				1		x		1
	500 M feet—sale area of 100 A.										
	Average 14 A. cut over per month. Use 1 hour each month.										
	In addition to scaling in the woods.										
	(Time studies showed 80 A.–1 hour.)										
Scaling	The contract provides that scaling will be done at intervals of 15 days provided 25 M is available for scaling. This will usually require a scaling trip to be made twice each month, from April to October.	500 M, 4,000 logs.	Apr.			1	5		4	2	1
			May.			1	5		4	2	1
			June.			1	5		4	2	1
			July.			1	5		4	2	1
			Aug.			1	5		2	1	7
			Sept.			1	5		2	1	7
			Oct.			1	5		4	2	1
	Average 50% scaled at mill at 60 logs per hour.										
	Average 50% scaled in woods at 30 logs per hour.										
	Grand average 45 logs, average 125 feet b. m. each, per hour=5,625 M										
	Average 71 M per month or 13 hours per month.										
	(Each trip 6½ hours job, plus 2 hours travel.)										
Brush disposal	Requires no time in addition to that given in connection with general woods supervision.						x		x		

Form 576w

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

Forest Management—Continued

Major activities and their elements	Perfection and intensity Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eights per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
	WEST FOOTHILLS COMPARTMENT (TUSAS AREA)										
Timber sales—Con.	Sale by tree measurement—W. Y. P.										
Sample marking	One 10–A. sample plot will be marked and analyzed at the time of marking.	10 A.	Nov.				4		x		4
Marking	Sufficient timber will usually be marked in advance to run an operator from several months to a year. Record of the marking will be kept by subunits marked on the ground for use in control of payments. (100 M—350 trees a day—with tally man.)	500–M. 1 trip.	Nov.			3	4		2	3	6
	10 per cent of the trees, up to 100 trees will be scaled in order to determine the defect factor. This will not be necessary if defect figures are available from adjoining or similar country.	1 trip.	Apr.			1	4		2	1	6
	Scaling for defect factor. (See above.)	100 trees.	May.				6		x		6
Supervision	Inspections of the sale will be made semimonthly, when cutting over 75 M a month; monthly when cutting less. 1 hour job each trip. 2 hours travel each trip.	1 trip.	Apr.				1		2		3
		2 trip.	May.				2		4		6
		1 trip.	June.				1		2		3
		1 trip.	July.				1		2		3
		2 trip.	Aug.				2		2		4
		2 trip.	Sept.				2		2		4
		2 trip.	Oct.				2		4		6
		2 trip.	Nov.				2		4		6
		2 trip.	Dec.				2		4		6
Brush disposal	Burning of fire lines by the operator will be supervised by the ranger.	2 miles.	Nov.				4		x		4
	PAISLEY SMALL SALE AND FREE USE AREA										
	The ranger will visit area once a month from March to September. Mark trees and scale material felled since previous trip and inspect area. (Average 50 trees marked and 100 cords scaled and inspected each trip—3 hours.)	700 cords.	Mar.				3		4		7
			Apr.				3		4		7
			May.				3		4		7
			June.				3		4		7
			July.				3		4		7
			Aug.				3		4		7
			Sept.				3		4		7

	OTHER SMALL SALES										
	House logs, posts, poles, etc.	96 M sales.									
	These will be grouped as much as possible.	2	Apr.		1		3		x		4
	Action on requests for small sales will if practical, be postponed and tied in with other trips. Follow-up to determine conditions will be handled likewise. Make the sales by tree measurement as a rule. (Average sale: 20 trees—select, caliper and mark—1½ hours.)	2	May.		1		3		x		4
		1	June.		1		2		x		3
		4	Oct.		2		6		x	1	0
		3	Nov.		2		4		x		6
Free use	Permits will not be required. Past experience has developed no difficulty in handling free use incidental to other work.										
Reports	Quarterly closing of smaller sales and miscellaneous memorandums regarding them.		Apr.		1						1
			July.		1						1
			Oct.		1						1
			Jan		1						1
	At the time of each trip to the larger sales a memorandum of the condition of the area will be included in the diary and made of record on Form 820.										
	The cutting reports, Form 820, will be submitted monthly. (1 hour per month.) (*See* Miscellaneous office.)	9 to 12	Y L.								
	Annual free use report and annual seed report.	2	Dec.		1						1
	Small mill appraisal data will be obtained currently at mills and report made in December. Conferences with operators held while on inspection trips and included in time for that work.		Dec.		2						2
Insect control	No noticeable infestation present on the district, and no control project needed or contemplated. Observations will be made on all trips about the district and report made annually of conditions as found. (All sections of the district are traversed in the course of other work.) *See also the development section.*	1 report.	Dec.		2						2

Form 576w

SAMPLE—JOB-LOAD ANALYSIS, PART 1

Range Management (Grazing)

Composite forest.
Composite ranger district.

Analysis made —— by C. E. R., G. A. S., E. W., F. B. A., R. H., D. A. S., J. H. H., B., L. A. D., E. W. L.

Objective: As stated more fully in G–12 and the program of work obtain at reasonable cost of administration (less than 7 cents per head, "direct,") as complete and balanced use of the range as may be obtained with adequate consideration given other resources and uses of the forest including timber production, game, and recreation

Major activities and their elements	Local standards of Perfection and intensity / Method and practice	Quantity per year	Proper months to do job in	Time in days and eights per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Management plans	Special local problems and difficulties are: (1) Numbers of stock— Check of capacities. Check of type maps. Effect of early lambs and per cent of lamb crop on capacities. Effect of numbers of elk. (2) Seasonal use— Compliance by sheepmen with unit plans. Determination of date when range is ready for use, and adjustment of opening date accordingly. (3) Distribution— Interest and responsibility on the permittee's part in his allotment. Proper use of more inaccessible areas. Extend bedding-out usage. Proper distribution of salt and cattle at beginning of season. Further study of driveway locations. (4) Miscellaneous—game, etc— Further study of winter range for game, and segregation of any additional suitable areas. Proper open seasons for hunting and fishing. Study gopher infestation. Study and keep abreast of the demand for recreation needs.										

Application notices	The ranger will have notices of dates for filing grazing applications posted by postmasters in post offices at Dayton, Ranchester, and Parkman.	7,925 C. 28,630 S. 49 owners. 3	Jan.		2						2	
Form 642	Send card notice, Form 642, to all regular permittees notifying them of the dates on which the ranger will be at Parkman, Dayton, and Ranchester for the purpose of taking grazing applications. (20 per hour.)	60 appls. 49 permits.	Jan.		3						3	
Taking	Applications will be taken at Dayton, Ranchester, and Parkman on the dates set. Mail application blanks to those who are unable to be there. (1 day of service at each town—travel included.)	50	Jan.			2	2	0	6	3	0	
	Certain applicants will come to ranger's headquarters at Sheridan, Wyo., to make application. (30 minutes each.)	10	Jan. Feb.		5						5	
Approval	Go over grazing summary sheet with supervisor and agree upon basis of approval of applications.	60	Feb.		3						3	
Investigations, new applicants	Investigation of qualifications of new applicants, when there is doubt as to qualifications. (See Procedure in G. Handbook—averages 20 minutes each.)	10	Feb.		4						4	
	Investigations in connection with transfer of preferences. Largely by supervisor's office.—Courthouse records and interviews. (1¼ hour each, average.)	3	Feb.		4						4	
Meetings	Meeting with Bighorn Cattlemens Association, to discuss approval of grazing applications and other range meeting matters.	1	Feb.				4		2		6	
	Meeting with Little Tongue River Association for the same purpose in supervisor's office in Sheridan.		Feb.		3						3	
Notebook forms	Listing applicants, number of stock, brands, etc., on notebook forms and filling in names of units on 14–R. 2 and 15–R. 2 inspection forms.		Feb.		4						4	
Allotment maps	Revise topographic map, showing range allotments. Total of 28,630 S. & G. under permit.	2 copies.	Jan.		4						4	
Counting: S. & G. shearing counts	See p. 35, Range Management Handbook. Shearing tally will be obtained by written requests where owner grazes exclusively on forest.	50 per cent of 15 owners.	June.		2						2	
Tally book	Of remainder approximately 50 per cent can be obtained from the camp tender's tally book, incidental to range inspection.	25 per cent of 22 bands.										
	In addition about 25 per cent will actually be counted at the corral or on the range. (5½ bands of 1,300 head each.) (To round-up, improvise a corral sometimes, and count—average of 2 hours, 45 minutes each band.)	25 per cent of 22 bands.	June. July.				6 1			1	6 1	
	Total of 7,925 C. & H. under permit.											
Counting: C. & H Little Tongue Feed lot	Association rider will count Little Tongue unit cattle as they come on the forest. Ranger will get record from him incidental to inspection of range.	8 permits.	June.									
	Count of cattle of other owners whose stock are entirely provided for on the forest. Will be handled by feed-lot counts—counting about 50 per cent each year—2,000 head. (See the trip plan for analysis of time needs for this item.)	50 per cent of 2,200 head, 18 permits.	Mar.			2	4	2	4	5	0	

Form 576w

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

Range Management (Grazing)—Continued

Major activities and their elements	Perfection and intensity Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Management plans—Continued. Counting: Freeze-out drift fence count	Other applicants, whose applications are disapproved in part, will be counted at the Freezeout drift fence—about 50 per cent each year, 1,200 head of cattle.	50 per cent of 5 permittees, 1,200 head.	June.				6			0	6
Allotment boundary posting	Allotments defined by topographic features and posting unnecessary except in few cases where boundaries have been changed. Can be handled in connection with regular inspection trips.										
Trespass	Preseason trespass is not important since boundaries controlled largely by drift fences. Season trespass is also negligible.										
Letters of instruction	Letters of instruction will be prepared and furnished riders, setting forth the distribution of salt and cattle on the range and other things shown in the plan as being necessary, including blue print of unit plan map. Where cattle units are unorganized a letter will be sent to each individual permittee setting forth salting, distribution, and other things for which he is responsible. (See below.) In case of sheep permittees, the instructions in regard to handling sheep on the range will be issued direct to the owners, except nonresident owners, and other permittees not actively managing their stock, in which case the letter will be issued to the manager. (Unit time 2 hours.) These letters will be prepared out of the peak season, in March, and dated for mailing the latter part of May. Typing of material extracted from plans will be done by supervisor's office; the letters themselves by the ranger.	12	Mar.	3	0					3	0
Supervision: Advance observation	Advance observations on plant development to determine vegetation readiness. Observations will be made at the following points: Cattle range— Cutler Hill. Dry Fork. Nickel Mine fence. (Unit time 15 minutes.)	3	June.			0	1	0	3	0	4

	Special trip to Dry Fork only. On sheep range— Prospect Creek. Pole Creek. Fool Creek. Special trip to Fool Creek only. (See trip plan.) All observations will be recorded on Form 21–R–2	3	June.			0	1	0	x	0	1	
Inspections policy	2 inspections of each range unit. (Stocked 19 surface acres per 6 sheep or 1 cow.)											
Spring inspection policy	Will usually cover only those portions of the range which have been used up to that time, except when (1) new herders or riders are on the range, they will be shown the full area and boundaries of their units; and (2) it may be desirable to determine if unused range is ready for use or if premature use is occurring through drifting, on those portions. Check for trespassing stock on all allotments will be made on this trip.											
Spring inspection C. & H.	Check distribution and information requested on inspection outline, conforming to the unit plan. Other special things in connection with the allotment. See unit plans. Inspections should be followed by corrective action with permittees wherever necessary. (See route map and part 3 for details.)	9 units, 7,925 C. & H.	June.			9	0			9	0	—
Follow-up action	Follow-up action by letters, telephone, or personal interview with permittees. (Details in appendix.)		June.		3		4		3	1	2	
Spring inspection, S. & G.	Check open herding and bedding out, and condition of camps. Show herders allotment boundaries if necessary. Obtain information as called for on inspection outline, making it conform to management plan and special things pertaining to the unit. Corrective action. (See route map and part 3 for details.)	13 units. 28, 630 S. & G.	July.			6	2			6	2	
	Follow-up action by letters, telephone calls, or personal interview with permittees. (Details in appendix.)		July.		3		1		1		5	
Fall inspection policy	Fall inspections should ordinarily cover all usable parts of the range, and should include a complete check-up on utilization and other information requested in the inspection outline and management plans.											
C. & H.	Fall inspection. (See route map and part 3 for details.)		Sept.			8	3			8	3	
S. & G.	Fall inspection. (See route map and part 3 for details.)		Aug.			3	3			3	3	
	Follow-up action will be taken with permittee only when he or his representative is encountered on the ground; otherwise a copy of the inspection slip will simply be transmitted to him, or the matter allowed to go over until the taking of grazing applications.		Sept.			3	0			3	0	

Form 576w

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

Range Management (Grazing)—Continued

Major activities and their elements	Local standards of Perfection and intensity	Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
					Nonfield		Field				Total	
							Job		Travel			
					Days	Hours	Days	Hours	Days	Hours	Days	Hours
Field follow-up	In place of a midseason general range inspection, a midseason follow-up will be made on things which the spring inspection indicates are necessary. The 1931 needs are as follows; and are taken as representative of recurrent demands in this regard: (In addition to having owners along if possible during regular inspections.)											
	Trip with Verne Griffith over his sheep allotments.			July.			1	0	1	0	2	0
	Trip to Beaver Creek and Little Tongue to check on redistribution of cattle and talk with rider, incidental to trip to Sheridan for other purposes.		1	July.			0	1	0	1		2
	Trip with Burns L. S. Co. foreman, over Bull, Dry Willow, and Spring units.			July.				5		3	1	0
Grazing—trouble shooting	Unforeseen trouble in connection with range administration—average.			Aug.			2	0			2	0
Show-me trips	Get the following owners and managers to make trip over other allotments with ranger: Burns, Gor, Griffith, and Ed Frazier; 2 a year. (These in addition to trips with ranger on his regular trips.)			Aug.			1	0			1	0
Meetings	The ranger will attend all annual meetings of the Bighorn Cattlemens Association, the Little Tongue River Association, and Sheridan County Woolgrowers.		3	Mar.			1	1	0	2	1	3
Beef round-up	Ranger will spend 1 day with the owners when on the beef round-up.		1 roundup.	Sept.			1	0			1	0
Range improvements	Maintenance will be done by permittees and inspected by ranger during the course of his regular trips.			June.				4				4
Range appraisal	Figures will be secured annually on carrying capacity, rentals, value, etc., of grazing lands comparable to N. F. lands.		1 report.	Nov.		2						
Plans	Annually, revision will be made as indicated to be necessary from observations of use of ranges during the previous year.		32 plans.	Jan.	2	0					2	0
				Feb.	2						2	0
Annual report	Annual grazing report and supplemental data.		1	Nov.	2	0					2	0

Unit plan	Record actual use data by subunits.		1	Nov.	2	0					2	0
Quadrats	Maintain fences around inclosed administrative sites.			Aug.				1				1
	Tongue plot.			Aug.				1				1
	Burgess plot.		3	Aug.				1		x		1
	Twin Buttes plot.			Aug.		1		4		x		5
	Rechart 1 quadrat each year.											
Fish, fry, and game	1 annual shipment of fry from Federal hatchery. Transportation of fry from Sheridan to streams by cooperation. Ranger will supervise planting of fry. Streams to be stocked as set forth in 5-year planting plan, in fish and game plans.		1	Aug.				1		2		3
State cooperation	State will plant about 100,000 fry in Tongue River streams. The State will also cooperate by hatching eggs and planting fry obtained from Federal hatcheries in Yellowstone Park. Ranger will cooperate in both cases and also check up in the latter case to assure the planting of the fish in the stream designated.			Aug.				2		3		5
Patrol	Examine licenses and cooperate with local warden in detection of other game-law violations and in apprehension of violators.	25 licenses.		Oct.			2	0			2	0
	Examining licenses 25 sportsmen, 6 hours.											
	Handling 2 law-enforcement cases, 5 hours each.	2 cases.										
Annual report	Annual supplement 5-year plan.			Nov.		4						4
Field observation	Field observation will be made on habits and number of game animals.											
	With assistant game warden make winter counts of game on Tongue River, Wolf Creek, Amsden, and Littlehorn Canyons. (See the development section.)											

Form 576w

SAMPLE—JOB LOAD ANALYSIS, PART 1—Continued

Lands

Composite forest.
Composite Ranger District.
Analysis made 1927-1930 By ———.

Objective: To fix the ultimate exterior boundaries and acquire by exchange and purchase the desirable timber-producing lands within those boundaries. To encourage and regulate recreational use of national forest land and in so doing reduce the resulting fire liability to a minimum. To encourage a summer home business confined to areas set aside for this purpose in accordance with the recreational plan for the district. To anticipate the future recreational use of the district and prepare for handling it

Major activities and their elements	Perfection and intensity Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Special uses—old cases	All will be inspected once annually while on trips for other purposes. Reports will be submitted on Forms 399 where action is needed. Forms prepared so far as possible preseason. 4 pastures, average 200 A. at one-half hour each—2 hours. 20 corrals, pipe lines, etc., incidental. 12 cabins at 15 minutes each. Follow-up inspections will also ordinarily be made in connection with other trips. (4 at 15 minutes each.)	36	June. Jan. July. Aug. Sept. Sept.		2		1 2 1 1 1		x x x x x		1 2 2 1 1 1
New recreation uses	"Group surveys" are far enough in advance to handle business for the next 5 years. Applicants will be shown lots by the ranger or near-by guard. 5 by ranger annually at 1 hour, including travel.		July. Aug.				3 2				3 2
New other uses	Surveys and other action on—will be handled so far as practical, in connection with other work. Report and conference with applicant. (Average 3 cases of miscellaneous type per year job 0.2.)	2 1	Aug. July.		2 1		4 2		x x		6 3
Claims Public camps	Negligible. Inspection will be made with a frequency commensurate with their use. Ordinarily this will be done in the course of inspection of guards to whom will be delegated the sanitation and upkeep of the heavily used camps at: High Rolls, Potlach } Time set up under "guard inspection."										
	Lightly used camps will be inspected at monthly intervals from June 1 to Sept. 30. (Time studies show 12 minutes each) use one-half hour.	8	June. July. Aug. Sept.				1 1 1 1		x x x x		1 1 1 1

Camp improvements	See Improvements for time for construction and maintenance. Excepting where climatic conditions make peak season work on camp grounds unavoidable it will be done during the less busy seasons.											
Boundaries	All are adequately posted. Annually 15 miles should be particularly checked, and missing or worn out posters replaced.	15 miles.	Mar.			3	0	In.		3	0
Exchange	The ranger will examine and report on all cases of less than 330 A. This work will be done out of the peak season. (Average case is 160 A. of cutover lands.)	1	Jan.	1	0					1	0
	No larger cases—those which the ranger would assist the staff to handle are anticipated.		Nov.			1	0		4	1	4
Reports	Annual section corner. Annual visitors. Annual miscellaneous.	3	Dec.		3						3

Form 576w

SAMPLE—JOB-LOAD ANALYSIS, PART 1

Fire Control

Composite forest.
Composite ranger district.
Analysis made ——— by ———.

Objective: To hold the average annual area burned during a 5-year period to 0.2 per cent (463 A.) of the gross area of the district at a direct cost of not more than 1 cent per acre.

Major activities and their elements	Perfection and intensity / Local standards of / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Plans:											
Organization chart, map, and written instructions.	Will be reviewed and revised at a round table conference of supervisor and rangers before Apr. 1.	1	Mar.	1	0					1	0
	Written instructions re fire will be prepared for all improvement crew foremen.	2	Mar.		2						2
	Fire plan, organization chart, map, and specific instructions will be furnished all guards when entering on duty.	x	June.				x				x
Prevention publicity	Addresses before Seneca, Lincoln, Northarm, Engels, Genessee, Taylorsville, Crescent Mills grammar schools, and the grammar and high schools in Greenville before May 15.	9	May.	1		2	0	1	0	4	0
	Large framed signs on highways at 5-mile intervals.	28	Nov.				1		7	1	0
	Annual removal of large signs by Nov. 15.	28	May.				4		7	1	3
	Reposting by June 1.	28									
	Reposting of small signs at 2-mile intervals on all minor roads and trails by July 1. Mostly by guards and foremen. 82 small signs in part.	82	June.				2		x		2
Registration	None.	0									0
Law enforcement	Actionable cases average 20 per cent of all man-caused fires. Subordinate only to the needs of the initial attack, the first action on a fire will be to attain evidence to secure a conviction (1 hour office and 3 hours job for each case).	6	June 2.		2		6		x	1	0
			July 2.		2		6		x	1	0
			Aug. 2.		2		6		x	1	0
Camp-fire permits	From May 1 to Oct. 15 permits issued by the guards or by agencies approved by the supervisor.		May to Oct.	x							x
Burning permits	No burning allowed from May 15 to Oct. 1 without permit, issued usually by State wardens and rarely by forest officers. (Not as yet a noticeable job on this district.)										

Presuppression Provisioning and maintaining guards	Supplies and equipment will be handled during regular inspection trips by the ranger. The Genessee guard will carry mail and supplies to Kettle Rock L. O. semimonthly as ordered by the dispatcher (prepare for trips 2 hours per month).	1 fireman, 5 lookouts.	June. July. Aug. Sept.	2 2 2 2						2 2 2 2	
Fire agents	Personally visit fire agents located at Greenville, Crescent Mills, Taylorville, Genessee, and Engel Mine and have them sign agreements which include their instructions. During American Forest Week explanation of instructions will be given new agents.	5	Apr.		2		6	1	0		
Transportation agents	Personally visit the transportation agents at Crescent Mills, Taylorsville, and Greenville and have them sign transportation agreements.	3	Apr.		1		x		1		
Per diem guards	Review annually by May 15 the list of inhabitants of the district and appoint in writing and instruct personally those qualified for per diem guards. (See Fire agents.)	5	Apr.	4	4	1	0	2	0		
Cooperation	Inspection of the Farrer lumber operation to check compliance with State law twice annually, the first May 1, and the second Aug. 15, submitting report on the last date.	1 1	May. Aug.		1 1		1 1		2 2		
Other agencies	Secure cooperation before June 1 with the Mt. Lassen Stage Co. for reporting fires.	1	May.	1			x		1		
Presuppression guards selection	Work will be done by correspondence and conference by the ranger, subject to supervisor's approval. Assistance as needed will be given by supervisor, who will also aid in the selection and allocation of the forest students.	4 lookout-firemen, 10 trailmen.	Apr. May.	2 2						2 2	
Preparatory policy	In order to get the telephone lines working, main trails open and the guards at their stations by the opening of the fire season, the ranger will have his entire protection force and at least a part of his trail force on trail and telephone work before May 31, regardless of weather conditions. They will be taken from this work for the fire training camp at Twin Creeks on June 1. Immediately after the fire camp the guards will be packed to their points of duty in accordance with the "packing on" statement even if fire weather is not imminent. If it is not, they will then be kept on improvement work at points from which they can reach their stations independently and within 12 hours after the ranger notifies them to assume their fire duties.										
Guard training camps	The training camp will be held at Twin Creeks beginning June 1 for a period of 3 days. It will be attended by all guards, all foremen, and 25 per cent of the men in all trail crews. The program will be prepared by the supervisor and ranger. The ranger will make all preparatory arrangements at the camp. The ranger will direct the camp assisted by the supervisor or his assistant. (1 day preparation in advance by ranger. Break-up 4 hours.)		May. June.	1 0	0 4	3	0		1 3	0 4	

Form 576w

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

FIRE CONTROL—Continued

Major activities and their elements	Local standards of Perfection and intensity / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip: Nonfield Days	Nonfield Hours	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
Follow-up training	Training at point of duty will be given each guard: 4 hours for "old" men and 1 day for "new"; 50 per cent turnover. All "new" men will then be required to spend 3 days becoming acquainted with their territory unless they have already covered it in connection with trail and telephone maintenance.	2 "new" at 8 hours each, 2 "old" at 4 hours each.			2	3	0	1	4	4	6
Packing-on.	See the Preparatory policy. The Genessee guard after packing himself on will help the Kettle Rock guard to establish himself at his station. The Mount Ingalls guard will do likewise with the Mount Hough guard. In each case the ranger will follow within a few days on his first inspection or training at point of duty trip and will give such additional aid as may be needed.		June.				x		x		
Guard inspection.	Each guard station will be inspected once a month by the ranger in addition to the installation trip. This calls for 3 inspections including 1 closing trip. (Install early June.) (Inspect early July, August, September—3 trips.) (Time study time has averaged 1½ hours.) (Providing Bill Jones continues on Kettle Rock the August and September inspections of that station may be omitted.)	4 stations at 2 hours each.	July. Aug. Sept.		2 2 2	1 1 1	0 0 0	1 1 x	2 7 x	2 2 1	4 9 2
Tools and equipment.	Will be reconditioned after each fire by the protection force or by the fire fighters. All tools will be kept in condition by the guard force, ready for use at any time. All ordinary maintenance will be taken care of by the guards. All extraordinary maintenance, such as overhauling telephones, lookout boards, etc., will be bunched at Avery and taken care of by the ranger during the winter.	2 phones and 5 map boards general overhauling per year.	Feb.			3				3	

Sitting tight.	Upon receipt of forecasts of lightning storms, the ranger will remain at the nearest telephone until it is known in what region the lightning is striking, when he will proceed to a telephone as near the center of that area as possible. Otherwise sitting tight should be done under instructions from the dispatcher—either asked for or given. During sitting-tight time-office work provided in the plan will be done. In addition lost time is set up.		July.	1	0					1	0
			Aug.	1	0					1	0
Suppression.	The ranger personally will go immediately to all fires reported as class B or C. In the event of 2 or more class B or C fires reported burning at the same time, he will place the least dangerous under competent supervision and then handle the most dangerous himself, unless relieved by the supervisor. He will also go immediately to all class A fires which due to hazardous conditions, may become class C and also to all class A fires within a radius of 3½ miles of the place where he is located at the time they are seen or reported. If there is little likelihood that other fires will start in the meantime he will go at once to all fires. All fires which the ranger does not personally attend will be inspected by him, or a designated guard who was not in the suppression force, within 24 hours after reported out. When concentration of lightning fires or extraordinary conditions prevail, the inspection will be made as soon as possible. This exception will be very rare. The foregoing provides for a personal check or a recheck at the fire area itself on all fires reported out.										
	Average per year, past 5 years: 2 class C fought—field 3 calendar days, office 1 day. 2 class B fought—field 1 calendar day, office 3 hours. 4 class A fought—field 4 hours, office 1 hour. 4 class A inspected—field 1 hour, office 1 hour. Total above time—field, 10.4 days; office, 3.6.	12 all classes.	June.		7	2			x	2	7
			July.	1	0	4			x	5	0
			Aug.	1	0	3			x	4	0
			Sept.		7	1	4		x	2	3
Damage appraisal.	The ranger will appraise damage on all class B and C fires, except those which are of such size as to require handling on a project basis, 5 per cent cruise to be made. (463A. in 2 class C and B fires.)		Oct.	1	0	2	0	1	0	4	0
Night travel to fires.	Is required to nearest practicable point to fires the complete location of which are not known. This includes an immediate start with night travel at least part of the way to all fires. To fires, the location of which are known, night travel on this district is possible and is mandatory. However, in each case a follow-up of additional help to start at daybreak will be provided before leaving for the fire.										
Night work.	Upon reaching fires at night, work will begin at once and not put off until daylight. (See also the development section.)										

Form 576w

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

Operation General

Composite forest.
Composite ranger district.
Analysis made June, 1930, by ———.

Objective: To hold the necessary incidental work, much of which is unproductive, to the minimum needed for businesslike disposal of the work of the district and for the keeping up of necessary equipment and records

Major activities and their elements	Local standards of Perfection and intensity / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Mail and supplies	No time needed. Mail and stage line passes R. S.										
Requisition	Annual requisition of miscellaneous supplies and equipment.	1	Dec.		2						2
Forage	Preparation forage estimates. Hay and grain contracts and bids, handled by supervisor's office.		Jan.		1						1
Fuel	Only needed for Twin Creeks office and at Center camp. Wood purchased for office.		Oct.		1						1
Care of quarters	Taken care of by guards except quarters at Twin Creeks by ranger. (See Miscellaneous.)	Jan. to Dec. incl.									
Maintenance of personally owned equipment	Maintenance of car, horses, riding equipment by district ranger in winter.		Dec.			6				6	
	Ditto, ½ day a month, March to November, inclusive.			5	0					5	0
Government equipment	Annual inventory and check of equipment at guard stations to be made on last inspection trip or at time of removal.						x				
	Improvement equipment will be checked when turned in by improvement crews.		Oct.		4						4
	Repairs to miscellaneous equipment, etc., 3 days, in January.		Jan.	3	0					3	0
	Preparation of annual property return by district ranger.		Jan.	1						1	
Ranger meeting	In January at supervisor's office.	1	Jan.	3	0				4	3	4

Miscellaneous	Miscellaneous correspondence. (This subject needs much more study.)										
		Per mo.									
Mail	820 cutting reports—larger sales—	1 hour									
	Incoming. Monthly average 30 pages single spaced pica type pages—not letters, at 3 minutes each.	1½ hours									
	Outgoing. Data for composing and typing average 3 pages single spaced pica type pages, not letters, at 60 minutes each.	3 hours									
	Bulletins, etc., average 45 pages single spaced pica type pages, not letters, at 2 minutes.	1½ hours									
	Filing, etc.	1 hour									
	Current publications and articles.	2 hours									
	Form 26 and expense account.	1 hour	Each month	24						24	0
Conference	With public at ranger station on work not related to specific activity in balance of analysis, 18 per month at 10 minutes each.	3 hours									
	Monthly review of work plan.	1 hour									
	Monthly follow-up of work plan.	1 hour									
	Care of quarters.	2 hours									
	Time slips, accounts, transfer of property.	2 hours									
	Total	2½ days per month									
	Close files and winter overhauling of library including amendments to manuals and handbooks.		Jan.	3	0					3	0
Plan of work	Annual review and revision of analysis and plan.		Mar.	2	0					2	0
	Inspectors on the district will fit their work in with that of the ranger; some special time necessarily devoted to them.		July.		4			x		x	4
			Aug.		4			x		x	4
Study courses	Required courses will be taken on official time. Optional courses will be taken 50 per cent on personal time for the minimum requirements of the course. All other supplementary reading will be on personal time.		Dec.	1	0					1	0
			Jan.	2	0					2	0
			Feb.	2	0					2	0
			Mar.	2	0					2	0

Form 576w

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

Improvements

Composite forest.
Composite Ranger District.
Analysis made June, 1930, by ———.

Objectives: To construct and maintain roads, trails, and ways to such an intensity that a member of the protective organizatcn can reach the line of any fire in the district in the pine belt within one hour after he receives a report. To construct and maintain other improvements up to regional standards

Major activities and their elements	Local standards of Perfection and intensity / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Road maintenance	Maintenance of 75 miles of roads and motor ways, approximately 50 per cent of which will be worked annually by a self-subsisting crew of 3 men under supervision of district ranger.										
	The projects to be worked and the order followed will be shown on a map brought to date each year by the district ranger.		Mar.		2						2
	Reconnaissance of roads and motor ways to determine needs and amount of maintenance, by district ranger accompanied by foreman.		Apr.			1				1	
	Organization and installation of crew. 1 trip.		Apr.		4	1			5	2	1
	Inspection of work by district ranger, 1 trip monthly.		May.				2		5		7
			June.				2		4		6
	Crew will complete maintenance in June and start on construction program about July 1.										
	(Work of crew will be inspected when practicable while ranger is on trips to other jobs.)										
Road and motor way construction	Maintenance crew will start construction about July 1.										
	Reconnaissance in advance of work by supervisor and ranger ordinarily by car and afoot.	10 miles, 1 crew.	Oct.				6		2	1	
	Location and survey—by district ranger assisted by supervisor's office—10 miles.		Mar.			5			6	5	6
	Installation of crew on construction by district ranger—travel by car.		July.		2		4		4	1	2
	Inspection of crew monthly by district ranger—travel by car—from August to October inclusive, 3 trips—2-hour job.		Aug.				2		4		6
			Sept.				2		4		6

Maintenance of structures and fences	American camp plant by guard. Pine Crest by guard. Cow Creek by guard. Inspection made during regular guard inspection trips incidental.		May.								
Camp ground improvement maintenance	High Rolls improvements of all kinds by Gennessee Creek guard. Pine Crest recreation area by Mount Hough guard. Potlach by Mount Ingalls guard.										
Estimates	Preparation of improvement allotments for forest supervisor.		Jan.	1	4				1	4	
Range improvements	Taken care of by permittees, but ranger to inspect while on range inspection trips. (See G. section.)										
Water system	Jawbone—repair water system by guard.		July and Aug.								
Trail maintenance	Maintenance of 200 miles of trail, 70 of which is to be worked annually by one 2-man crew, burro method, self subsisted.										
	Supplies left at designated points by the district ranger when on other jobs. Map showing trails to be worked and the sequence to be followed will be furnished crew by district ranger Organization and installation of crew.		May.		2		4		3	1	1
	Inspection of work by district ranger monthly; travel in connection with other jobs. One hour job per trip from June to Sept. inclusive. Crew will be furnished with map showing projects to be worked.		June. July. Aug. Sept.				1 1 1 1		 x x x		1 1 1 1
Trail construction	None contemplated for the next 5 years.										
Road and trail signs	Placing in position 12 road and trail signs annually. Backing and posts to be prepared when signs are received, usually in March. 6-hour job. Average of one-half of signs will be placed by road and trail maintenance crews at points marked by the ranger.		Mar.		6						6
	Remainder by district ranger while on other work, 6 signs, 20 minutes each. 1 hour July, 1 hour September. Travel incidental to other work.		July, Sept.				1 1		 x		1 1
	Preparation of sign requisition.		Dec.		2						2
Telephone lines	Will be maintained by temporary labor—guards on the job before the fire season opens excepting work on telephone instruments and such trouble shooting, as can best be handled by the ranger.	84 miles.									
	Assemble and instruct the crew while working with it.		Apr.		2	1	0	1	0	2	2
	Inspect crew at 15-day intervals.	1 trip.	Apr.				1		4		5
	1 hour job—1 day travel each trip.	1 trip.	May.				1	1	0	1	1
	Work by ranger on instruments will be done during guard inspection trips or out season. (See Equipment.)										
	Trouble shotting—primarily by guards—balance by ranger, if necessary, to quicken clearance of lines monthly. 1 hour job, 2 hours travel.	Monthly.	June to Nov.				6	1	4	2	2

Form 576w

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

Other Development or Noncurrent Work

Composite Forest.
Composite ranger district.
Analysis made——— by———.

Objectives: To obtain material to aid in the development of the district. To establish demonstration plots for P. R and training purposes. (See also current studies by branch subjects.)

Major activities and their elements	Perfection and intensity Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eights per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Reproduction studies	3 plots to be established by ranger.	1931 3	May.				3		x		3
	On Spring Gulch sale (3 at 1 hour each).	3	May.				3		x		3
	On Tusas sale (3 at 1 hour each).	3	Oct.				1		x		1
	Record conditions annually Spring Gulch plots; Tusas plots while on other trips.	3	Oct.				1		x		1
Planting	Continue planting on Devils Head experimental plot. 500 trees a year. Get stock from nursery en route.		May.			1	0		2	1	2
Methods of cutting	Studies in methods of cutting.[1]	Currently.	Dec.	1	0					1	0
	Studies in brush disposal.[1]	Currently.									
	Annual progress reports.[1]	2									
Inventory of cut-over areas	All saw-timber sale areas cut over during the year will be calipered as provided in the Forest Management Handbook. (Average stand of 1,500 M. per A., left.) (For 1 crew—ranger in charge—100 A. per day.)	200 A.	Nov.			2			2	2	2
Thinnings	Project 14—See working plan instructions to determine effectiveness and cost of various degrees and methods of cutting. Crew supervised and work participated in by ranger. (4 plots at 2 days each, including notes.)		May.	1	0	7	0		x	8	0
Special report	For publication in bulletin, newspaper, or magazine regarding local minor research projects.		Dec.	3	0					3	0

Driveway	See if new location for sheep driveway can not be found up Willow Creek ridge.	2 miles.	Sept.			0	4		x	0	4
Quadrat (See recurrent also)	Fence plot in sagebrush type on Dry Fork of Littlehorn, near Wagner special-use cow camp, 75 feet square with 1 sagebrush counting plot 10 feet square inside and 10 foot check plot outside.										
	Also count all sagebrush within the inclosure as well as staked area 75 feet square outside.	1 quadrat.	Oct.			2	0		4	2	4
Cooperation Biological survey	Get accurate information on rodent-infested areas, their location and extent—incidental to fall range inspection. (Approximately 2,000 A. in 10 areas.)		Sept.				4		x		4
Salting studies	A study of salt and salting requirements should be undertaken under a working plan prepared by the district office.	Future.									
Unused areas	Investigation of possibility and desirability of utilization by domestic stock of present unused areas, such as the high parks on west side of Dry Fork and east side of lower South Tongue. Should be utilized or left for game.		Oct.			1	4		4	2	0
Water development	Investigate possibilities of increasing carrying capacity of Dry Fork unit by developing springs on upper bench below lower Dry Fork drift fence. Estimate of cost and possible increase in carrying capacity—in connection with fall inspection trip. The same for Miiler and Schunk range on Dry Fork ridge.		Sept.				6				6
Game census	With assistant game warden take winter census of game in Tongue, Wolf, Amsden, and Littlehorn country.		Mar.			6	0	4	0	10	0
Hazard reduction	Annually complete 13 hazard reduction projects of the 65 listed in the hazard reduction program for the district during nonhazardous weather from Oct. 15 to May 1.		Jan. or Feb.			1 1	5 5	1 1	5 5	3 3	2 2
	(13 jobs at 4 hours each, i. e.; 2 hours job, plus 2 hours travel.)										
Improvement	Construction of 1 major project annually for next 5 years. Supply depot, drift fences, and other projects which will be used to extend the period of employment of guards. Not projects at the guard stations or others which should be underway during the fire season.										
	Standard plans, specifications and bills of material revised to meet local needs. Approval by supervisor. Materials and equipment from standard specifications ordered by forest clerk.		Jan.	1	0					1	0
	Organize crew, instruct foreman, and get the project under way. Inspect at intervals of 10 days.	1 2 trips.	Oct. Oct.		2	2	0 4	1	4 0	2 1	6 4

[1] See written instructions for individual sales.

SAMPLE—JOB SHEET

Sheet 1
National forest, Composite.
Administrative unit, Composite.
Date plan was made, March 10, 1930; by whom, F. R. M., F. O. D.

The items below the lines ruled in black are nonrecurrent or development jobs.
NOTE.—Words in italics are lined out in red on original forms to indicate overload jobs that are not to be done.

Trip No.	JANUARY Job	Time: Non-field Days	Non-field Hours	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
	Check S. budget	0	1					0	1
	Close small sales	0	1					0	1
	Prepare Forms 399	0	2					0	2
	Exchange survey report	1	0					1	0
	Forms 642 G	0	3					0	3
1	G. applications—Dayton			0	6	0	2	1	0
1	G. applications—Ranchester			0	6	0	2	1	0
1	G. applications—Parkman			0	6	0	2	1	0
	G. applications—Sheridan	0	3					0	3
	G. map revision		4					0	4
	Revise G. plans	2	0					2	0
	Inspection estimates	1	4					1	4
	Forage estimates	0	1					0	1
	Annual property return	1	0					1	0
	Recondition equipment	3	0					3	0
	Ranger meeting	3	0			0	4	3	4
	Close files and amend guides	3	0					3	0
	Study course	2	0					2	0
	New and other jobs as follows:								
	M. P. O. equipment								
	Form 26 and miscellaneous office	2	4					2	4
	Total recurrent	20	7					24	3
	Hazard reduction			1	5	1	5	3	2
	Total nonrecurrent or development								
	Grand total							27	5

Trip No.	FEBRUARY Job	Time: Non-field Days	Non-field Hours	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
	Cruising		1	4	0		2	4	3
	Cruising notes, compile	2						2	
	S—appraisal	1	4	1	0		2	2	6
	G. applications, Sheridan		2						2
	G. applications, approval		3						3
	G. applications, investigate		4						4
	G. perferences, investigate		4						4
	Meeting of Bighorn Assn				4		2		6
	Meeting of Tongue Assn		3						3
	Prepare notebook		4						4
	Revise G. plans	2	0					2	0
	Recondition equipment	3	0					3	0
	Study course	2	0					2	0
	New and other jobs as follows:								
	M. P. O. equipment								
	Form 26 and miscellaneous office	2	4					2	4
	Total recurrent	15	5					21	7
	Hazard reduction			1	5	1	5	3	2
	Total nonrecurrent or development								
	Grand total							24	5

Trip No.	MARCH Job	Time: Non-field Days	Non-field Hours	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
	Paisley sale area	----	1	----	3	----	2	----	6
	Post forest boundaries	----	----	3	0	----	x	3	0
	Feed lot counts	----	----	2	4	2	4	5	0
	Annual meeting Bighorn's Assn	----	----	----	3	----	2	----	5
	Annual meeting Tongue Assn	----	----	----	3	----	x	----	3
	Annual meeting Sheridan Assn	----	----	----	3	----	x	----	3
	Revise fire plans and instr	1	2	----	----	----	----	1	2
	Road location	----	----	5	----	----	6	5	6
	Trail sign backs	----	6	----	----	----	----	----	6
	Review and revise analysis and plan	2	0	----	----	----	----	2	0
	Study course	2	0	----	----	----	----	2	0
	R. & T. map	----	2	----	----	----	----	----	2
	New and other jobs as follows:								
	----------	----	----	----	----	----	----	----	----
	----------	----	----	----	----	----	----	----	----
	----------	----	----	----	----	----	----	----	----
	----------	----	----	----	----	----	----	----	----
	----------	----	----	----	----	----	----	----	----
	----------	----	----	----	----	----	----	----	----
	M. P. O. equipment	----	4	----	----	----	----	----	4
	Form 26 and miscellaneous office	2	4	----	----	----	----	2	4
	Total recurrent	9	3	----	----	----	----	25	1
466	*Game census*	----	----	*6*	----	*4*	----	*10*	*0*
	Total nonrecurrent or development	----	----	----	----	----	----	----	----
	Grand totals	----	----	----	----	----	----	----	----

Trip No.	APRIL Job	Time: Non-field Days	Non-field Hours	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
A–B	Show S. prospects (2)	----	----	----	4	----	4	1	0
1–2	Mark S. boundaries	----	----	----	x	----	x	----	x
1	Mark Spring Gulch sale	----	----	2	1	----	2	2	3
1–3	Inspect Spring Gulch sale twice	----	----	----	1	----	x	----	1
1–3	Scale Spring Gulch sale twice	----	----	1	5	----	4	2	1
2	Marking Tusas sale, 1 trip	----	----	1	4	----	2	1	6
2	Inspect Tusas sale, 1 trip	----	----	----	1	----	2	----	3
4	Pailsey sale area	----	----	----	3	----	4	----	7
1–2–4	Other small sales (2)	----	1	----	3	----	x	----	4
	Close small sales	----	1	----	----	----	----	1	0
	Letters of instructions (S. & G.)	3	0	----	----	----	----	3	0
1–2–4–C	Interview 5 fire agents	----	----	----	2	----	6	1	0
1–2–4–C	Appoint 5 per diem guards	----	4	----	4	1	0	2	0
	Hire guards and crew	----	2	----	----	----	----	----	2
D	Road maint. reconnassiance	----	----	1	----	----	x	1	----
E	Road maint. start crew	----	4	1	----	----	5	2	1
F	Telephone maint. start crew	----	2	1	0	1	0	2	2
4	Telephone maint. inspec	----	----	----	1	1	0	1	1
	New and other jobs as follows:								
	----------	----	----	----	----	----	----	----	----
	----------	----	----	----	----	----	----	----	----
	----------	----	----	----	----	----	----	----	----
	----------	----	----	----	----	----	----	----	----
	----------	----	----	----	----	----	----	----	----
	----------	----	----	----	----	----	----	----	----
	M. P. O. equipment	----	4	----	----	----	----	----	4
	Form 26 and miscelaneous office	2	4	----	----	----	----	2	4
	Total recurrent	7	6	----	----	----	----	25	7
	Total nonrecurrent or development	----	----	----	----	----	----	----	----
	Grand totals	----	----	----	----	----	----	----	----

SAMPLE—JOB SHEET—Continued

MAY										JUNE									
Trip No.	Job	Time								Trip No.	Job	Time							
		Non-field		Field				Total				Non-field		Field				Total	
				Job		Travel								Job		Travel			
		Days	Hours	Days	Hours	Days	Hours	Days	Hours			Days	Hours	Days	Hours	Days	Hours	Days	Hours
1-3	Inspect Spring Gulch sale, twice				1		x		1	*Staff*	*Inspect Spring Gulch sale, twice*				*1*		*x*		*1*
1-3	Scale Spring Gulch sale, twice			1	5		4	2	1	*Staff*	*Scale Spring Gulch sale, twice*			*1*	*5*		*4*	*2*	*1*
2	Scaling—defect factor—Tusas sale				6		x		6	*Staff*	*Inspect Tusas sale, 1 trip*				*1*		*2*		*3*
2-4	Inspect Tusas, 2 trips				2		4		6	*Staff*	*Paisley sale area*				*3*		*4*		*7*
1	Paisley sale area				3		4		7	2-1	Other small sales (1)		1		3		x		4
2-3	Other small sales (2)		1		3		x		4	2-1	Inspect uses				1		x		1
1-2	Address 9 schools	1	0	2	0	1	0	4	0	2-1	Inspect recreation camps				1		x		1
1-2	Signs posted—truck				4		7	1	3		Write and obtain shearing tallies		2						2
4	Inspect mill refire (Farrar's)				1		x		1	D	Count S. & G. (near R. S.)				6		x		6
	Cooperation from stage company—Fire		1				x		1	B	Count C. & H. at Freezeout fence				6		x		6
	Hire guards and crew		2						2	1	Vegetative readiness C. & H. (3)				1		3		4
	Prepare guard training camp	1	0					1	0	2-1	Vegetative readiness S. & G. (3-1)				1		x		1
1	Road maintenance inspection				2		5		7	2-1	Spring C. & H. inspection			9	0			9	0
2	Telephone maintenance inspection				1		4		5	C	Follow-up action—inspection		3		4		3	1	2
4	Start trail maintenance crew		2		4		3	1	1	1-3 D-2	Inspect maintenance of grazing improvements				4		x		4
										2-1	Fire signs—small				2		x		2
										E	Law enforcements (2) fire		2		6			1	0
										1	Guard training trip—2 old, 2 new		2	3	0	1	4	4	6
										A	Hold guard training camp			3	0			3	0
										Staff	Break-up guard camp		4						4
										F	Suppression		7	2	0			2	7
										Staff	Road maintenance inspection				2		4		6
										2	Trail maintenance inspection				1				1
										Staff	Telephone trouble shooting				1		2		3
	New and other jobs as follows:										New and other jobs as follows:								
	M, P. O. equipment		4						4		M, P. O. equipment		4						4

	Form 26 and miscellaneous office	2	4	----	----	----	----	2	4		Form 26 and miscellaneous office	2	4	----	----	----	----	2	4
	Total recurrent	5	6	7	0	4	7	17	5		Total recurrent	2	5	24	1	4	2	34	0
3	Establish 3 reproduction plots, Spring Gulch	----	----	----	3	----	x	----	3										
4	Establish 3 reproduction plots, Tusas	----	----	----	3	----	x	----	3	Staff	Overload to be cared for by staff	----	4	2	5	2	0	5	1
A	Plantation, Devils Head	----	----	1	0	----	2	1	2		Balance left for ranger	5	1	21	4	2	2	28	7
B	4 thinning plots	1	0	7	0	----	----	8	0										
	Total nonrecurrent or development	1	0	8	6	----	2	10	0		Total nonrecurrent or development	----	----	----	----	----	----	----	----
	Grand total	6	6	15	6	5	1	27	5		Grand total	----	----	----	----	----	----	----	----

SAMPLE—JOB SHEET—Continued

JULY										AUGUST									
Trip No.	Job	Time								Trip No.	Job	Time							
		Non-field		Field				Total				Non-field		Field				Total	
				Job		Travel								Job		Travel			
		Days	Hours	Days	Hours	Days	Hours	Days	Hours			Days	Hours	Days	Hours	Days	Hours	Days	Hours
3 (½St)	*Inspect Spring Gulch sale, twice (once staff)*				*1*	*x*			*1½*	2-3	Inspect Spring Gulch sale, twice				1		x		1
3 (½St)	*Scale Spring Gulch sale, twice (once staff)*			*1*	*5*		*4*	*2*	*1½*	2-3	Scale Spring Gulch sale, twice			1	5		2	1	7
1	*Inspect Tusas sale, 1 trip*			*1*			*2*		*3*		Check S. budget		1						1
Staff	*Paisley sale area*				*3*		*4*		*7*	1-2	Inspect Tusas sale—2 trips				2		2		4
	Close small sales		1						1	3	Paisley sale area				3		4		7
1	Inspection uses				2		x		2	2	Inspect uses				1		x		1
1-2	Survey and report—new uses		1		2		x		3	2	Survey new uses and report		2		4		x		6
A	Show applicants lots				3		x		3	A	Show new uses applicants lots				2		x		2
1	Inspect camps				1		x		1	3-2	Inspect camps				1		x		1
B	Count S. & G			1	1		x	1	1	2	Fall S. & G. inspection			3	3			3	3
1	Spring S. & G. inspection			6	2			6	2	2	Maintenance quadrat fences (3)				3		x		3
C	Spring S. & G. inspection follow-up		3		1		1		5	2	Rechart quadrat		1		4		x		5
2	Follow-up inspection—Verne G. units			1	0	1	0	2	0	B	G. trouble shooting			2	0			2	0
2	Follow-up inspection—Beaver and Tongue				1		1		2	C	Show me—G.—trips (2)			1	0			1	0
3	Follow-up inspection—L. S. O. units				5		3	1	0	D	Stock stream—Federal fry				1		2		3
D	Law enforce—(2)—fire		2		6			1	0	E	Stock stream—State fry				2		3		5
1	Guard inspection trip (4 at 2 hours)		2	1	0	1	2	2	4	F	Law enforce—(2)—fire		2		6		x	1	0
0	Sit tight	1	0					1	0	2	Guard inspection trip (4 at 2 hours)		2	1	0	1	7	2	9
E	Suppression	1	0	4	0			5	0	1	Inspect Farrar Mill refire				1		x		1
Staff	*Start road crew*		*2*		*4*		*4*	*1*	*2*	0	Sit tight	1	0					1	0
1	Trail maintenance inspection				1		x		1	G	Suppression	1	0	3	0			4	0
3	Trail signs				1		x		1	3	Road construction inspection				2		4		6
	Telephone trouble shooting				*1*		*2*		*3*	2	Trail mainteannce inspection				1		x		1
0	With inspectors		4						4	4	Telephone trouble shooting				1		2		3
										0	With inspectors		4						4
	New and other jobs as follows:										New and other jobs as follows:								
	M. P. O. equipment		4						4		M. P. O. equipment		4						4

Form 26 and miscellaneous office	2	4					2	4	Form 26 and miscellaneous office	2	4					2	4
Total recurrent	6	7					30	7	Total recurrent	6	4	16	3	4	2	27	1
Staff overload to be handled by staff as indicated							3	2									
Balance left for ranger	6	5					27	5									
Total nonrecurrent or development									Total nonrecurrent or development								
Grand total									Grand total								

SAMPLE—JOB SHEET—Continued

Trip No.	SEPTEMBER Job	Time: Non-field Days	Non-field Hours	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
2–3	Inspect Spring Gulch sales, twice				1		x		1
2–3	Scale Spring Gulch sales, twice			1	5		2	1	7
1–2	Inspect Tusas sale 2 trips				2		2		4
3	Paisley sale area				3		4		7
2	Inspect uses and follow-up				2		x		2
2	Inspect camps				1		x		1
2	Fall inspection C. & H			8	3			8	3
	Fall inspection S. & G			3	3			3	3
A	Beef round-up			1	0			1	0
2	Guard inspection trip (4 at 2 hrs.)		2	1	0		G	1	2
B	Suppression		7	1	4			2	3
3	Road construction inspection				2		4		6
2	Trail maintenance inspection				1		x		1
2	Trail signs				1		x		1
C	Telephone trouble shooting				1		2		3
	New and other jobs as follows:								
	M. P. O. equipment		4						4
	Form 26 and miscellaneous office	2	4					2	4
	Total recurrent	4	1					24	1
2	Plot rodent areas				4		x		4
2	Locate Willow Creek driveway				4		x		4
2	Investigate redeveloping springs				6		x		6
	Total nonrecurrent or development							1	6
	Grand total	4	1					26	2

Trip No.	OCTOBER Job	Time: Non-field Days	Non-field Hours	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
1–3	Inspect spring Gulch sale, twice				1		x		1
1–3	Scale spring Gulch sale, twice			1	5		4	2	1
1–2	Obtain growth data	1	0	2	4		x	3	4
2–4	Inspect Tusas sale 2 trips				2		4		6
1–2	Other small sale (4)		2		6		x	1	0
	Close small sales		1						1
	Annual free use, etc., reports		1						1
	Sales appraisal data		2						2
A	Game law checks and cases			2	0			2	0
B	Fire damage appraisal	1	0	2	0	1	0	4	0
C	Road reconnaissance				6		2	1	0
3	Road construction inspection				2		4		6
	Check inspection crew equipment		4						4
D	Telephone trouble shooting				1		2		3
	Fuel		1						1
	New and other jobs as follows:								
	M. P. O. equipment		4						4
	Form 26 and miscellaneous office	2	4					2	4
	Total recurrent	6	3	10	3	3	0	19	6
3	Observe reproduction plots Spring Gulch sale				1		x		1
4	Observe reproduction plots, Tusas sale				1		x		1
4	Fence quadrat			2	0		4	2	4
1–3–E	Start and inspect improvement crew—3 trips		2	2	4	1	4	4	2
	Investigate unused grazing areas			*1*	*4*		*4*	*2*	*0*
	Total nonrecurrent or development		2	4	6	2	0	7	0
	Grand total	6	5	15	1	5	0	26	6

Trip No.	Job	NOVEMBER Time: Non-field Days	Non-field Hours	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
A	Cruising	----	1	4	0	----	2	4	3
1	Mark Spring Gulch sale	----	----	2	1	----	2	2	3
2	Sample marking Tusas sale	----	----	----	4	----	x	----	4
2	Marking Tusas sale	----	----	3	4	----	2	3	6
2-4	Inspect Tusas sale twice	----	----	----	2	----	4	----	6
4	Brush disposal Tusas sale	----	----	----	4	----	x	----	4
1-4	Other small sales (3)	----	2	----	4	----	x	----	6
B	Survey Exchange area	----	----	1	0	----	4	1	4
	Range appraisal data	----	2	----	----	----	----	----	2
	Annual G. report	2	0	----	----	----	----	2	0
	Actual use data	2	0	----	----	----	----	2	0
	Game plan and report	----	4	----	----	----	----	----	4
1-2-D	Signs down	----	----	----	1	----	7	1	0
	Telephone trouble shooting	----	----	----	1	----	2	----	3
	New and other jobs as follows:								
	M. P. O. equipment	----	4	----	----	----	----	----	4
	Form 26 and miscellaneous office	2	4	----	----	----	----	2	4
	Total recurrent	8	1	----	----	----	----	23	5
3-4	Cutover area inventory	----	----	2	----	----	2	2	2
	Total nonrecurrent or development	----	----	----	----	----	----	----	----
	Grand total	----	----	----	----	----	----	25	7

Trip No.	Job	DECEMBER Time: Non-field Days	Non-field Hour	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
	Report on S-studies	----	1	----	----	----	----	----	1
2-4	Inspect Tusas sale—twice	----	----	----	2	----	4	----	6
	Miscellaneous L. reports	----	3	----	----	----	----	----	3
	Trail sign requisition	----	2	----	----	----	----	----	2
	Equipment requisition	----	2	----	----	----	----	----	2
	Study Course	1	0	----	----	----	----	1	0
	New and other jobs as follows:								
	M. P. O. equipment	6	0	----	----	----	----	6	0
	Form 26 and miscellaneous office	2	4	----	----	----	----	2	4
	Total recurrent	10	4	----	----	----	----	11	2
	S-studies progress reports	1	0	----	----	----	----	1	0
	Inspect construction plans	1	0	----	----	----	----	1	0
	Special R. S. article	3	0	----	----	----	----	3	0
	Total nonrecurrent or development	5	0	----	----	----	----	5	0
	Grand total	15	4	----	----	----	----	16	2

Form 578w

SAMPLE—JOB-LOAD ANALYSIS—PART 3—TRIP AND JOB PLAN

MONTH, MAY

Composite forest.
Composite ranger district.
Plan made March 10, 1930, by F. R. M., F. O. O.

Assigned to	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
Ranger		*Trip No. 1:*								
	1–8	By truck from Twin Creek R. S. with large sign boards.								
		To Spring Gulch sales, scale and inspect cutting area.				7		2		
		Continue to the Paisley sale area—mark, scale and inspect cuttings.				3		4		
		To Seneca, Lincoln, Northarm, and Engle schools for forest protection talks.			1			4		
		Then to the road maintenance crew—inspect.				2		5		
		Return to Twin Creek R. S. via Genessee—give talk there.				1				
		Place large signs in place en route.				2		3		
		(Travel above is prorated.)								
		Total for trip No. 1.			2	7	2	2	5	1
		New and other jobs:								
		Trip No. 2:								
	8–15	By car from Twin Creek R. S. to the Tusas sale. Inspect area and scale to determine the defect factor.				7		2		
		Handle small sales business en route.				1				
		Then to Taylorsville, Crescent, and Greenville schools for talks on forest protection.				7		4		
		Inspect telephone maintenance crew in Tusas Valley.				1		4		
		On return trip to R. S., place large fire signs in place.				2		4		
		Total for trip No. 2.			2	2	1	6	4	0
		New and other jobs:								

	Trip No. 3:									
16–20	By car from Twin Creek R. S. to Spring Gulch sale. Scale and inspect.				7		1			
	Establish 3 reproduction study plots on area.				3		x			
	Return to R. S.						1			
	Handle small sales business en route.				2		x			
	Total for trip No. 3.			1	4		2	1	6	
	New and other jobs:									
	Trip No. 4:									
22–28	With trail crew in truck go to beginning point of new trail construction, start crew.				4		3			
	Then to Tusas sale area, inspect and return to R. S.				1		2			
	Establish 3 reproduction plots on Tusas area.				3		x			
	En route inspect fire precautions taken at Farror's Mill.				1		x			
	Total for trip No. 4.			1	1		5	1	5	
	New and other jobs:									
	SPECIAL TRIPS OR PROJECTS									
	Trip No. 1:									
(1)	A. From Twin Creek via Nursery to Devils Head experimental area and return. Plant 500 trees.			1	0		2	1	2	
	B. Establish with aid of crew, 4 experimental thinning plots. (See Project 14, working plan.) (Travel included in job time.)			7	0			7	0	
	NONFIELD									
28–31	Prepare for guard training camp.	1	0							
	Prepare addresses or other P. R. material.	1	0							
	Records of thinning experiment.	1	0							
	Other office. (See Job list Part 2.)	3	6							
	Total	6	6	15	6	5	1	27	5	

[1] Before May 15.

Form 578w

SAMPLE—JOB-LOAD ANALYSIS—PART 3—TRIP AND JOB PLAN—Continued

MONTH, JUNE

Composite forest.
Composite ranger district.
Plan made March 10, 1930, by F. R. M., F. O. O.

Assigned to	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
Ranger	4–16	*Trip No. 1:*								
		With pack outfit, principally to train guards at point of duty. Inspect limited area of adjacent spring C. &. H. ranges en route. From R. S. to Genessee L. O. point inspecting High Rolls C. & H. allotment via Big Draw, Echo Gulch, Peavo Draw, and High Rolls Ridge.			1	0	All			
		Install fire signs en route.				1		x		
		Observe vegetative readiness at Cutler Hill observation station. Train lookout—fireman at Genessee an experienced man.				4		x		
		To Kettle Rock L. O.—(Part travel is guard inspection.)						3		
		Inspecting spring range in Maxwell country through Blue Mesa rim around head of Porcupine.			1	3	All			
		Train lookout fireman at Kettle Rock, "new" man, take him on trips adjacent to his station.			1	0				
		Inspect special uses en route at Billings and Jones' places.				1		x		
		Check on condition of High Rolls recreation area.				x		x		
		Inspect condition of range improvements.				x		x		
		To Mount Hough. Train guard (new) at point of duty and take him on trips in adjacent country.			1	0		6		
		Then southwest back into Spring C. & H. range over the Little Tongue basin inspecting spring range; over the Ingalls allotment and Potlatch ridge to Mount Ingalls L. O.			1	4	All	3		
		Train Mount Ingalls lookout-fireman at point of duty. (Experienced man.)				4				
		Check condition of Potlatch recreation camp.				x				
		Handle small sales in vicinity Potlatch.				2				
		Detour to observation plot in Dry Fork for vegetative readiness data—observing same at Mickle Mine en route.				1		3		
		Return over Spring range to Twin Creek R. S. inspecting ranges en route in Copper Mine, Bold Knob, and Twin Creek Canyons.			1	1	All			
		Total for trip No. 1			8	5	1	7	10	4
		Other new jobs;								

	Trip No. 2:								
18–28	Continue with pack outfit on spring C. & H. range inspection to Fool Creek country, inspect trail crew en route.				1		x		
	Observe vegetative readiness at observation station there.				1	x			
	Time includes observations later at 2 other stations.			4	0		All		
	Inspect C. & H. ranges via Spring Gulch lower Maxwell country, Gullett Basin, Forks of the Tongues, South Dry Fork and Tusas, Return to R. S.				1		x		
	En route, handle such small sales as come up.				x		x		
	Inspect Blackburn, Hoe Peterson, and James uses.				1				
	Check condition Spring Gulch and Dry Fork public camps and see that they are in orderly condition.				x				
	Inspection condition of range improvements.				1				
	Post fire signs.								
	Total for trip No. 2.			4	5	x	G	4	5
	Other jobs:								
	Trip No. 1: SPECIAL TRIPS OR PROJECTS								
1–3	A. Hold guard training camp at Twin Creeks.			3	0			3	0
	B. Count C. & H. at Freezout corral, repair corral.			1	0			1	0
	C. Follow-up action on spring C. & H. inspection.				4		3		7
	D. Count S. & G. at corral near R. S. repair corral.			1	0			1	0
	E. Law enforcement cases (2).				6				6
	F. Fire fighting.			2	0			2	0
	Other jobs:								
	Nonfield as itemized in part 2, The Job List.	5	1					5	1
	Totals,	5	1				2	28	7

Form 578w

SAMPLE—JOB-LOAD ANALYSIS—PART 3—TRIP AND JOB PLAN—Continued

MONTH, JULY

Composite forest.
Composite ranger district.
Plan made March 10, 1930, by F. R. A., F. O. O.

Assigned to—	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
Ranger	1–15	*Trip No. 1:*								
		Combined spring S. & G. inspection and lookout inspection.				1		(x)		
		With pack outfit from Twin Creeks through low country direct to trail crew, inspecting their work en route.				2		6		
		Continue to the Genessee L. O. Inspect High Rolls Camp. With guard 1¼ hours. Then over the S. & G. allotments on both sides of Porcupine River via Edge Gap, Pear Bank, Dreary Basin, North Boundary ridge and east slope Tongue.			1	6		All		
		To Kettle Rock L. O. Inspect.				2		(x)		
		Inspect uses at Jentry's, Poke's, Small's en route.				1		(x)		
		Continue over S. & G. range at head of Tongue along the Divide units, through Angles, Perch, and Shoestring Valleys to Mount Hough.			2	3		All		
		Inspect lookout.				2				
		Continue S. & G. inspection in side draws of Little Tongue back to the Divide rimming job, Allerton, Bear, and Seco Canyons to Mount Ingalls.			2	1		All		
		Inspect Mount Ingalls guard.				2		1		
		Inspect near-by Potlatch recreation camp (¼ hours).				1		(x)		
		Inspect special uses in Potlatch group.				1		(x)		
		To the Tusas sale area. Inspect.				1		2		
		Return to Twin Creek R. S. (Travel 3 hours. Guard inspection.)						3		
		En route handle such new uses as may come up.				1		(x)		
		Total for trip No. 1.			8	0	1	4	9	4
		Other jobs:								

	Trip No. 2.									
17–22	Trip with Verne Griffiths over his sheep allotments—follow-up of spring inspection.			1	0		4			
	Continue on to Beaver and Little Tongue; check on redistribution of cattle and talk with rider				1		1			
	Surveys for any pending use applications.				1		(x)			
	Return to R. S. (Follow up G. travel.)						4			
	Total for trip No. 2.			1	2	1	1	2	3	
	Other jobs:									
	Trip No. 3:									
24–28	To the Spring Gulch sale area by car. Scale, inspect, and return to R. S.				7		2			
	Erect trail signs en route.				1		(x)			
	While at mill, hire horse and go over L. S. Co. allotments with foreman.				5		3			
	Total for trip No. 3.			1	5	0	5	2	2	
	Other jobs:									
	SPECIAL TRIPS OR PROJECTS									
	A. Show lots to applicants for summer homes, travel included.				3		(x)		3	
	B. Count in S. & G. at Freezeout corral (near R. S.).			1	1		(x)	1	1	
	C. Follow-up as needed following spring S. & G. inspection.				1		1		2	
	D. Law enforcement (2) fire.				6				6	
	E. Fire suppression.			4	0			4	0	
	F. Telephone trouble shooting.				1		2		3	
	NONFIELD									
	With inspectors.		4						4	
	Sitting tight.	1	0					1	0	
	Miscellaneous office. (See items on Job List, part 2.)	5	1					5	1	
	Totals.	6	5	17	3	3	5	27	5	

Form 578w

SAMPLE—JOB-LOAD ANALYSIS—PART 3—TRIP AND JOB PLAN—Continued

MONTH, AUGUST

Composite forest.
Composite ranger district.
Plan made March 10, 1930, by F. R. M., F. O. O.

Assigned to	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
Ranger	1-3	*Trip No. 1:* By car from R. S. to Tusas sale and return. Inspect en route; fire precautions taken at Farvor Mill.				1 1		2 x		
		Total for trip No. 1.				2		2	0	4
		Other jobs:								
	4-20	*Trip No. 2:* Fall inspection of upper sheep ranges and monthly inspection of guards. With pack outfit to Genessee L. O. Inspect.				2		6		
		En route scale and inspect at Spring Gulch sale.				7		x		
		Inspect condition of near-by camp at High Rolls.				x		x		
		Inspect trail maintenance and crew.				1		x		
		Then to Kettle Peak L. O. Inspect.				2		6		
		Inspect uses en route at Bowman's, Peter's, and Allen's.				1		x		
		Over near-by S. & G. allotments north boundary and east slope of Tongue, Dreary Basin, and Peace Bank, Head of Tongue, and through Angles, Perch, and Shoestring Basins, on range inspection.			2	3	All			
		To Mount Hough. Inspect guard.				2		x		
		Continue high S. & G. range inspection back to the Divide rimming Job and Allerton Canyons.			1	0				
		To Mount Ingalls. Inspect guard.				2		1		
		Maintain with help of guard, quadrat fences (3).				3		x		
		Rechart quadrat near Mount Ingalls.				4		x		
		To the Tusas sale. Inspect.				1		x		
		En route survey new special uses for applicants.				4		0		
		Return to Twin Creek R. S. (guard inspection travel).						2		
		Total for trip No. 2.			7	0	1	7	8	7
		Other jobs:								

25-29	*Trip No. 3:*								
	By car from R. S. to Spring Gulch sale, scale and inspect.				7		2		
	Continue to the Paisley sale area, mark, inspect, and scale.				3		4		
	Return to R. S.								
	Inspect public camps at Spring Gulch, Garita, Lab.				1		x		
	Inspect road crew and work.				2		4		
	Total for trip No. 3.			1	5	1	2	2	7
	Other jobs:								
	SPECIAL TRIPS OR PROJECTS								
	A. Show summer home sites to applicants (travel included).				2		x		
	B. Trouble shooting on range.			2	0				
	C. Show-me trips (2).			1	0				
	D. Stock streams—meet Federal cooperators.				1		2		
	E. Stock streams—meet State cooperators.				2		3		
	F. Law enforcement (2 cases) fire.				6				
	G. Fire suppression.			3	0				
	H. Telephone trouble shooting.				1		2		
	Totals.			7	4		7	8	3
	NONFIELD								
	With inspectors.						4		
	Sitting tight.			1	0				
	Miscellaneous office. (See Job List, part 2.)			5	0				
	Totals.			6	4	16	3	4	2	27	1

Form 578w

SAMPLE—JOB-LOAD ANALYSIS—PART 3—TRIP AND JOB PLAN—Continued

MONTH, SEPTEMBER

Composite forest.
Composite ranger district.
Plan made March 10, 1930.

Assigned to	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
Ranger	1–4	*Trip No. 1:* By car from R. S. to Tusas sale and return. Inspect.				1		2		
		Total for trip No. 1.				1		2		3
		Other jobs:								
		Trip No. 2:								
5–25		With pack outfit on fall inspection of lower sheep ranges and cattle summer ranges. From R. S. over Spring Gulch allotment.			1	6		All		
		To spring Gulch sale. Scale and inspect.				7		x		
		Then to Genessee L. O. Inspect and close camp.				2		x		
		Make range inspection on all allotments at head of Spring Gulch, Porcupine River through Edge Gap to Kettle Rock.			3	2		All		
		Inspect public camp at Genessee en route and prepare for winter. (15)				1		x		
		Erect trail signs in this vicinity.				1		x		
		Inspect and close Kettle Rock L. O.				2		x		
		Continue through lower Porcupine and Big Tongue country inspecting all allotments to Mount Hough.			2	1		All		
		Inspect guard station and close for winter.				2		x		
		Plot rodent areas en route.				4		x		
		Locate Willow Creek driveway chance.				4		x		
		Then on inspection of Little Tongue division range and all in this territory not covered by the S. & G. inspection last trip.			2	3		All		
		Inspect trail maintenance and send in crew.				1		x		
		To Mount Ingalls inspect and close guard station.				2		x		
		Complete the fall inspection in Mickle Mine, Copper, Bald Knob, Dry Fork, and Tusas Canyon ranges, return to R. S.			2	2		All		
					2	2		All		
		En route stop at Tusas sale area. Inspect.				1		x		
		En route inspect uses and follow-up action.				2		x		
		En route investigate Dry Fork unused ranges as to possibility of developing springs on them.				6		x		
		Total for trip No. 2.			16	1		x	16	1

	Trip No. 3:								
26-30	From R. S. by car to Spring Gulch sale. Scale and inspect.				7		2		
	Then to the Paisley sale area. Mark, scale, inspect.				3		4		
	Continue on to the road crew. Inspect and return to the R. S.				2		4		
	Total for trip No. 3.			1	4	1	2	2	6
	Other jobs:								
	SPECIAL TRIPS OR PROJECTS								
	A. Attend beef round-up.			1	0			1	0
	B. Fire suppression.			1	4			1	4
	C. Telephone trouble shooting.				1		2		3
	NONFIELD. (See Job List, part 2.)	4	1					4	1
		4	1	20	3	1	4	26	2

SAMPLE—JOB-LOAD ANALYSIS—PART 3—TRIP AND JOB PLAN—Continued

MONTH, OCTOBER

Assigned to	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
Ranger.	1–8	*Trip No. 1:*								
		With improvement construction crew to Harrass Cabin site. Get work started.			2	0		2		
		Then to Spring Gulch sale. Scale and inspect.				7		2		
		Obtain growth data from increments borings and stump counts as provided in instructions.			1	2		x		
		Return to R. S. small sales handled en route.				3		x		
		Total for trip No. 1.			4	4		4	5	0
		New and other jobs:								
	9–12	*Trip No. 2:*								
		By car to the Tusas sale and return. Inspect sale.				1		2		
		Obtain growth data, see instructions.			1	2		x		
		Handle small sales en route.				3		x		
		Total for trip No. 2.			1	6		2	2	0
		New and other jobs:								
	23–27	*Trip No. 3:*								
		By car on third trip to the Harrass Cabin construction project. Inspect.				2		2		
		Then to the Spring Gulch sale. Scale and inspect.				7		2		
		Make observation on reproduction plots.				1				
		Return to Twin Creek R. S. via the road construction project. Inspect.				2		4		
		Total for trip No. 3.			1	4	1	0	2	4

26-31	*Trip No. 4:* By car to the Tusas sale area for inspection of cutting area. Observe reproduction plots. To the vicinity of the Wagner ranch. Erect a range experiment inclosure. Inclose and chart quadrats as called for in instructions for project 16. Return to R. S.			2	1 1 0		2 x 4		
	Total for trip No. 4.			2	2		6	3	0
	New and other jobs:								
	SPECIAL TRIPS OR PROJECTS								
	A. Checking on game law violations (they may fit in with any trip).			2	0			2	0
	B. Fire damage appraisal.			2	0	1	0	3	0
	C. Road reconnaissance trip with supervisor.				6		2	1	0
	D. Telephone trouble shooting.				1		2		3
	E. Second trip to inspection of Harrass Cabin const.				2	1	0	1	2
	NONFIELD. (See Job List, Part 2.)	6	5					6	5
	Totals,	6	5	15	1	5	0	26	6

Form 578w

SAMPLE—RANGER DISTRICT TRIP PLAN

(SAMPLE FROM REGION 5)

MONTH, JUNE

Stanislaus National Forest
Sonora ranger district
Plan made June, 1930, by Freer, Barker, Pitchlynn

Assigned to	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
		Trip No. 1:								
	4-6	First day—D. R. will drive from Tuolumne to Confidence where the A. R. will meet him thence to American camp, instruct guard. Thence to American Camp L. O., instruct lookout. Thence to Contention, instruct guard and on through to Center camp.				3		6	1	1
		Second day—D. R. will instruct F. C. at Center camp. Thence by car to Elizabeth L. O. with A. R. instruct lookout. Then to Pine Crest, instruct guard. Then to Cow Creek, instruct guard, and return to Tuolumne. A. R. will drive from Center camp to Confidence where his car will be left. On return he will drive from Confidence to Tuolumne to be prepared for trip No. 2 with D. R. Total trip—job 7 hours; travel 1 day, 2 hours.				4		4	1	
		Trip No. 2:								
	7-8	First day—D. R. accompanied by A. R. will drive from Tuolumne to Riverside R. S. and instruct guard. Thence to Sugar Loaf, instruct lookout-fireman. Thence to Duckwall, instruct lookout and return to Tuolumne.				3		5	1	
		Trip No. 3:								
	10-16	First day—D. R. will drive to Center camp where he will get saddle horse and pack, and with A. R. ride Deer Creek range. Endeavor will be made to have permittee meet at Yancey's. Go to Dry Creek cow camp for the night.				7		1	1	
		Second day—Riding of the Deer Creek range will be completed and then into the Rushing range, spending the night at Rushing Meadows. Effort will be made to have permittee accompany the D. R.			1				1	
		Third day—Continue riding Rushing range spending night at Rushing Meadows camp.			1				1	
		Fourth day—Continue riding Rushing range. To Rushing Meadow camp for night.			1				1	
		Fifth day—Complete riding Rushing range. Thence to Center camp where the A. R. will remain, the D. R. going by car to Tuolumne.				7		1	1	
		Trip No. 4:								
	18-26	First day—D. R. will drive to Confidence, pick up A. R., and then go to old camp Bumble Bee, secure horses from permittee and ride Beardsley range, returning to camp Bumble Bee for the night.				5		3	1	

Second day—By car from Bumble Bee to Stinchfield Place, secure horses from permittee and ride Strawberry range, returning to Stinchfield Place for the night.				7		1	1		
Third day—By car from Stinchfield Place to Brown's Meadow, secure horses from permittee and ride Brown's range to Brown's Meadow for the night.				7		1	1		
Fourth day—Ride upper Hull range to Brown's Meadow for the night.			1				1		
Fifth day—Ride upper Hull range to Brown's Meadow for the night.			1				1		
Sixth day—By car from Brown's Meadow to lower Hull Meadows, secure horses from permittee and ride lower Hull range to lower Hull Meadows for the night.				7		1	1		
Seventh day—Complete riding the lower Hull range and thence by car to Tuolumne via Confidence where the A. R. will be dropped. Inspection of road maintenance will be done in connection with this trip. Total trip—job 6 days; travel 1 day.				6		2	1		
SPECIAL TRIPS									
Guard meeting—Center camp R. S.			3				3		
Organization and installation of trail maint. crew.				4		3		7	
Training of new guards.			3				3		
Fire suppression.		2	1	6			2		
OFFICE WORK PLANNED									
Care of quarters.		1						1	
Miscellaneous office Forms 26, etc.	1						1		
Report on administrative plan.		1						1	
Totals,	1	4	20	2	3	4	25	2	

SUPERVISORY JOB-LOAD ANALYSIS AND PLAN

COEUR D'ALENE NATIONAL FOREST, 1930

Gross area: 790,234 A.
Project sales including sanitation cuttings:
Two, cutting each 10 MM to 12 MM per year.
Two, cutting each 4 MM per year.
Two, cutting each 2 MM per year.
Annual cut: 35 MM.
Average number of fires: 114 past 5 years.
Average area burned: 6,345 A past 9 years.
Average per cent class C: 8 per cent past 5 years.
Number of fireguard stations, in analysis.
Annual gross receipts: FY 1929 $230, 573 plus coop. deposits.
Annual gross expenditures, $150,000 to $363,000 (including $135,000 insect-control project in 1930).
Eight thousand S. & G.—Six owners.
Two to three minor road crews.

FOREWORD

This analysis is based on average and normal work and conditions. The trip plans attached to it have been made to determine for the analysis the average travel-time needs and probably will not at times fit actual conditions.

Thorough supervision and inspection and balanced standards of results have been uppermost in mind in determining the time requirements. These should be found to be flexibly adequate and the work plans found to be reasonably practicable to follow. System must be used to make it so. Essential to the development of an effective system will be, among other obvious points of practice, the avoidance of—

(1) Allowing lower-priority nonfield work to interfere with starting or continuance of trips to be scheduled.

(2) As far as practicable, visiting officers failing to match their trips with those of the supervisory staff.

Also essential to the development of such a system are—

(1) Delegating to the subsupervisory forces, especially during the summer months, all the work which in this analysis is delegated to them. This includes hiring of laborers and handling of minor routine duties.

(2) Participating in all classes of field work instead of specializing to such an extent that several officers need follow each other into the same region to handle the various classes of work—fire—roads—S.—O., etc.

SUMMARY OF WORK BY MONTHS AND CONCLUSIONS

COEUR D'ALENE SUPERVISOR ANALYSIS

	Days		Days
May	77. 7	November	53. 6
June	[1] 70. 6	December	45. 5
July	[1] 69. 0	January	47. 3
August	[1] 63. 6	February	46. 2
September	31. 8	March	48. 7
October	68. 0	April	69. 7
Total field season	381. 3	Total winter season	311. 6

On basis of staff consisting of supervisor, assistant supervisor, and logging engineer.

On basis of 25 days per month per man (allowing 15 days' annual leave each) surplus time is:

Field season: 69 days.
Winter season: 93 days.

[1] For these peak of the peak months the analysis shows need for a supervisory force of three men.

SUGGESTIONS FOR USING SURPLUS

Field: 69 days.
Additional overlap—Supervisor with his assistants in addition to that set up: 8 days.
Put part of appraisal work in September: 10 days.
Put part of land exchange examinations in September
Winter: 93 days.
Analysis of clerical job: 15 days.
Use Drake on project field work:
Land exchange.
Timber surveys.
Upper Big Creek cruise.
Steamboat check and appraisal.

SUMMARY OF PEAK SEASON SET-UPS

JUNE 1 TO AUGUST 31

Sales and F. M	days	32
G	do	2½
Improvements	do	21½
All fire	do	89½
L	do	2
Miscellaneous field and nonfield	do	50½—(4.0)
Analyzed	do	198
Computed in 1928	do	227

Form 576 w

SAMPLE—JOB-LOAD ANALYSIS, PART 1

Forest Management

Objective:

Analysis made October 1, 1930 by {C. W., C. D. S., E. K., M. H. W., L. C. S.

Coeur d'Alene forest.

Major activites and their elements	Perfection and intensity / Local standards of / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Project sales	Cut No. sales SELLING NEGOTIATIONS WITH PROSPECTIVE PURCHASERS	32 MM, 5									
	Sales made—average year. (For annual cut see inspection below.) Total volume sold M feet b. m. No. project 1 ---- 30,000 1 ---- 2,000 2 ---- 1,000 2 ---- 350 Ranger: 2 ---- 100 2 ---- 50 3 ---- 10 10 ---- below 10 Total volume sold 35,060 M feet b.m.										
	On large sale, average of 4 interested prospects. Minimum of 1 conference with (4).	4	Y. L.	1	1					1	1
	Additional conferences (2) with average of 2 outfits who are interested.	2	Y. L.		6						6
	Not necessary to show chances to purchasers.										
	On 5 other project sales and 2 of the ranger sales, supervisor will participate in negotiations.	7	Y. L.	2							
	Estimating—Supervisor will handle estimate on the larger sales.										
	75 per cent of the commercially accessible timber area on the forest has been cruised. This has to be checked by a 20 per cent cruise on 20 per cent of the area. (In the winter 1 man can cover 80 A. per day, that is 2 miles with ⅕ A. plots every 2 chains.)										

	Cruising is done in the late fall or winter by logging engineer and 2 to 4 of the regular salesmen.										
	Average volume cut per acre on sales is 14 M.										
	Check cruise on 1 sale—30.000 M, 2,140 A. By logging engineer and 3 men at rate of 160 A. per day—3 days' job.										
	Time by logging engineer.				(3		2)		(5)		
	20 per cent cruise on 1 sale—2,000 M.				1	4	2		3	4	
	20 per cent cruise on 1 sale—1,000 M.				1			4	1	4	
	20 per cent cruise on 1 sale—1,000 M.				1			4	1	4	
	20 per cent cruise on 1 sale—350 M.					4		4	1		
	20 per cent cruise on 1 sale—350 M.					4		4	1		
Appraisals	1 sale—30,000 M.										
	R. R. surveys when involved will be made under the direction of the regional office or forest logging engineer. Large sale requires 6 miles of survey. Requires about 2 days to the mile for 8 men.		Nonfield season.		(12		2)		(14)		
	Estimates and profile, etc., will be done by regional office of engineering.										
	Preparation of appraisal report including working up of estimates on —.		Nonfield season.	(6)					(6)		
	1 sale—2,000 M. (See estimate.)				4					4	
	1 sale—1,000 M.				4					4	
	1 sale—1,000 M.										
	Policy statement.—On areas where past appraisals show indicated stumpage, values are well below the minimum prices in effect. It will not be necessary to make an appraisal when it is evident that the chance in question will not show a value in excess of the minimum. A memorandum setting forth the circumstances briefly, will suffice for par. 10 in the timber sale report.										
	ADVERTISEMENT AND PREPARATION OF SAMPLE AGREEMENT ON										
	1 sale of 30 MM—prepared by supervisor.			2					2		
	On other 5 advertised sales—prepared by supervisor.			2					2		
	Logging cost data.—Salesmen will collect specific costs for various operations. Superviosor's staff will secure logging cost records from company officers.		Nonfire season.	1					1		
	(Conference with 2 bidders before date of bids covered above.) Showing a prospective purchaser over the chance—takes about 4 days every 2 years.	½	Y. L.			1	1		2		
	Bids go to regional office.										
	PREPARATION OF ADMINISTRATIVE INSTRUCTIONS TO MAN IN CHARGE										
	1 sale—30 MM—preparation by logging engineer.		Apr.		2					2	
	Review by supervisor.		Apr.		1					1	
	5 smaller sales—preparation by logging engineer.		Apr.		5					5	
	Review by supervisor.		Apr.		3					3	
	Boundary Posting.—Control points on boundary are marked at time of appraisal. Salesman can post boundary by reference to map and the marked points.										

Form 576 w

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

FOREST MANAGEMENT—Continued

Coeur d'Alene forest.

Analysis made October 1, 1930, by {C. W., C. D. S., E. K., M. H. W., L. C. S., E. W. L

Objective:

Major activites and their elements	Perfection and intensity Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Apprasials	*Marking timber.*—Will be performed by project salesman with such additional assistance as is needed to keep marking well in advance.					6				6	
	Supervisor's staff will participate in the marking on the project sales for the purpose of improving the marking practice and training of men, to the extent of 2 days per sale per year and sample marking on smaller sales						x				x
	On sales other than project the ranger will do the marking and supervisor's staff will check at time of ranger district inspection. This is a part of the smaller sale inspection job.										
Inspection	On all project sales cutting 2 mm or over per year, the supervisor's staff will make a general inspection every other month during the period of active operation. Such inspection to cover all active phases of the work. (For check scaling see below.) In addition, intermediate trips in the alternate months will be made for inspection of the sanitation work when it is active and where crews of 10 men or more are employed on it.										
	Slash burning.—Will require 1 additional trip in the fall by supervisor's staff. (See appendix for details of trips to sales.)										
	Inspection						Inspection				
	Sale / Yearly cut, M ft. b. m. / Marking / Inspect all phases / Check scale / Travel gross / Travel Net						Net		Net		
	Copper Creek 10,000 / 2.0 / 4.4 / 3.0 / 6.0						4	4			
	Burnt Cabin 12,000 / 2.0 / 5.0 / 3.0 / 3.4 / 11.0						5	0	11	0	11	0
	Picnic Creek 4,000 / 1.0 / 2.4 / 2.0 / 3.6						2	4				
	Eagle Creek 4,000 / 1.0 / 1.6 / 2.0 / 4.4 / 5.2						1	6	5	2	5	2
	Keeler Creek 2,000 / --- / 1.4 / 1.0 / 3.6						1	4				
	Colburn 2,000 / --- / 1.4 / 1.0 / 1.4 / 1.0						1	4	1	0	1	0
	Supervisor's staff will make an annual inspection of 50 per cent of the ranger sales of 50 M and up.	2						4				4
	And representative samples of the smaller sales incidental to ranger district inspection.	10						2		1		3

Check scaling.—The supervisor's staff will check the work of each scaler (F. O. S. in charge and temporary) twice each season (200 to 300 logs on each check). Requires about one-half day per man. This check will usually be worked in with the general inspection of the sale.

	Scaler assistants to F. O.—No. of man checks
Cooper Creek	2
Burnt Cabin	2
Picnic Cabin	1
Eagle Cabin	1
Keeler Creek	—
Colburn Creek	—

Check scaling on small sales will be included with general ranger district inspection.

Slash disposal.—Piling and burning is done by crews working under the forest officer in charge. Piling usually carried on currently with the cutting operation and burning mostly in October and November, with about 20 per cent in April and May. Inspection by supervisor's staff above.

Sanitation.—Felling defective hemlock, etc., lopping, piling, and burning the slash. Varies from 25 to 70 cents per M ft. b. m. on sales where sanitation work is done. Five of the 6 project sales require sanitation work.

Supervisor's staff will make trip to each sale area to see that crew is properly instructed and on sales where crew is 10 men or more, an inspection will be made each month. (See inspection above.)

Cutting reports.—Submitted monthly, checked for accuracy by clerk and checked and approved by supervisor's staff.

On 6 large sales—42 per year	42	May to Dec.		6								6
On 17 small sales—20 per year	20			1								1

Cost record.—Submitted from field monthly, on all project sales. Summarized by project men on detail in winter. Reviewed by supervisor.

		Jan.		1								1

Quarterly cut and sold report.—Prepared by clerk and reviewed by supervisor.

		Jan. Apr. July Oct.		1								1

Cooperative scaling.—In some cases operators pay approximately one-half the cost of scaling on Government lands and use the Government scale for settlement with subcontractors. Any increase in value of work is included above.

Service contracts with operators to scale timber on private lands which are being cut in connection with Government sales. Operators pay pro rata share of actual cost on basis of volume. Covered in volume of work under scaling above. (Amounts to about $2,500 per year.)

Cooperative slash disposal.—The forest contract to dispose of the slash resulting from the cutting of approximately 40,000 M on private lands within and near the forest annually. Handled in same manner as slash on Government lands above. Mostly subcontracted.

About 25,000 M is intermingled with Government sales.

About 15,000 M is cut from areas outside of sale areas. Located on about 5 small areas, totaling about 1,200 A.

Cooper Creek	6	Season.			3						3	
Burnt Cabin	6	Season.			3						3	
Picnic Cabin	4	Season.			2						2	
Eagle Cabin	4	Season.			2						2	
Keeler Creek	2	Season.			1						1	
Colburn Creek	2	Season.			1						1	

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

Forest Management—Continued

Major activites and their elements	Perfection and intensity / Local standards of / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
	Supervisor's staff will visit each area once during piling work and at time of burning. 2 hours on area at each trip.		G. I.			1	6		3	2	1
	Atlas Tie—Lakes district. Higbee and Son—Lakes district. Boro Bros.—Grizzly Mountains. Bogle—Lakes district. One other —Lakes district.		Oct.			1	2	1	2	2	4
	Timber settlement.—Average of 1 case per year—generally with power lines, dam flowage, etc.—run from 50 to 200 M.										
	Review and approval of report by supervisor's staff.	1				1				1	
	Inspection will be made incidental to other trips.							2		2	
	Timber trespass.—Very little at present. Field work by ranger or project men. Report reviewed and approved by supervisor.	1				2					
	Management plans inventory.—Timber survey work covering areas which have not been covered satisfactorily will be carried on in the winter to the extent of available man power.										
	History of sale, including map of area and estimate of residual stand is prepared and filed at close of each sale. The estimate of the residual stand will be made currently as each unit of a sale is completed. Any work not completed at time of closing will be caught up during next year.		Nov. to Mar.								
	Work will be started by supervisor's staff and inspected at intervals.										
	Work is carried on during a 2-month period. Logging engineer needs to spend about 2 weeks on it.		Mar. Apr.			4 4	7 7	1 1		8 8	4 4
	Cut from each sale is entered in cutting budget each year.	30	Jan.	1						1	
	5 years after the close of each sale an examiatnion will be made of the cut-over area by sample plot method by someone with technical ability.										
	About 2,500 A per year.										
	At the rate of 1½ miles per day—1 trip through each 40–a supervisor's staff job.	15 miles	Fall or spring.			10				10	
Insect control.	Best estimate of future eradication is a $10,000 job for 2 or 3 seasons. Work probably confined to 2 ranger districts with two 25-man crews—1 each district for a 2-month period. 4 spotting crews. Spotting starts Apr. 15, treating about Apr. 20; finish by June 15. Spotting and camp foremen										

	work will be handled by detailed rangers or by salesmen. Rangers have charge. Ranger checks spotting and crew work. About 30 men hired by supervisor's office. Rangers requisition equipment and supplies, and clerk sees that orders are filled.										
	Plans.—Location of work determined by supervisor from Bureau of Entomology Survey report and after 2 conferences with entomologists.		Apr.		4						4
	Reports.—Annual summary of ranger's report with supplement.		Dec.		2						2
	Supervision and inspection.—Supervisor lines up and trains spotting crews at initiation of work. Makes second inspection in about 10 days. Checks 1 mile of line.		Apr.			4		2		6	
	Spends one-half day with each eradication crew.		May.			3		2		5	
	Blister rust.—This is a possible activity but nothing planned for the present.										
	Planting.—Office of planting does planting survey and makes plans.										
	Projects will be under direct supervision of district ranger. Staffman will advise with ranger as to soil readiness, check condition of trees on arrival, method of heeling in, organization of crews, demonstrate proper planting methods by planting a few trees himself and having end men or foremen plant for one-half hour. Then, start off crews, calling attention to each man's errors, continue check on quality of work, and gradually increase quantity to standard output. Staffmen will make 2 inspections during remainder of job.		Oct. May.			3 1	4	1 1	4 4	5 2	4
	McGee area—50-man crew for 1 month, for 5-year period. Three 15-man, field crew.	1,500A									
	Supplies and equipment requisitioned by ranger—orders filled by clerk. (See Hiring men, O—Supervision, general.)										
	Survey and posting and staked rows will be handled by officer in charge of job.										
	First report (Form 134) submitted by officer in charge of job on completion. Reviewed by supervisor.										
	Progress report submitted by ranger at end of first growing period.										
	Final report submitted by ranger at end of 3-year period.										
Phenological observations.	2 plots on each of 2 districts. Checked by supervisor on general inspection.		G. I.				2				2
	Log prices.—Semiannual report to R. O. All operators written to. (Refer to correspondence.)										
	Retail lumber prices.—Semiannual report to R. O. 3 companies written to. (Refer to correspondence.)										
Reports.	*Seed crop report.*—Summary and supplement of ranger's report.		Aug.		1						1
	Library report.—Handled by clerk.										
	Private lands—Timber survey.—Annual report. Handled by executive assistant.		Mar.								
	Forest inspections.—See Visiting officers—Operation section.										
	Sale area map record will be brought up to date annually. Will be done by detailed salesman.	1	Jan.								
	Timber survey map record will be brought up to date annually. To be done by salesman.	1	Jan.								

Form 576 w

SAMPLE—JOB-LOAD ANALYSIS, PART 1

Operation

Coeur d'Alene forest
Plan ma de —— by ——

Objective: Reduce the average annual area burned to 1,573 acres, 0.2 of 1 per cent of the gross area of the forest. (Actual average burned last 10 years, 15,384 acres.)

Major activities and their elements	Perfection and intensity Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Fire control	*Fires in last 10 years.*—										

	A	B	C	Total
1921	38	18	13	69
1922	61	23	8	92
1923	65	8	4	77
1924	49	26	3	78
1925	63	25	8	96
1926	62	15	8	85
1927	84	8	2	94
1928	50	13	13	76
1929	113	41	19	173
1930	115	26	3	144
	700	203	81	984
1929 (maximum C's)	113	41	19	173
1927 (minimum C's)	84	8	2	94
Average last 10 years	70.0	20.3	8.1	98.4
Number of years on which average, equaled or exceeded	3	5	6	
Number of years above mean in number of C's				3
Number of years below mean in number of C's				4
Average number of C's in years over mean				11.5
Average number of C's in years over C's exclusive 1929				10

Allowable annual burn by types according to classification at d. r. f. meeting 1930.

Type	Area (gross) (1,000 A.)	Factor	Total acres
W. P	502	0.001	502
Y. P	18	.002	36
L.-F	217	.0025	542
L. P	12	.010	120
Sp	1	.001	1
Sub. Alp	31	.012	372
Total protected	781		1,573
Subalpine—barren, grass, brush, etc	9		
Total area	790		

Average area burned annually—9 years, 1921–1929=7,039.
Average area burned annually—10 years, 1921–1930=6,345.

Hour control map.—Postponed until statistical analysis and transportation study has been further developed.								
Travel time maps.—Will be kept up currently by trial trips made by firemen and checked by rangers. Rangers will submit their copies each winter and corrections will be transferred to supervisor's copies by detailed range or project man. Review and inspection by supervisor's staff in field on regular inspection trips.								
Forest spot map.—Will be kept up currently. Supervisor's staff brings map up to date at end of each season.	98	Jan.		2				2
Forest burned area map.—1 inch to the mile—fires over 40 A.	6	Jan.		2				2
Forest lightning spot map.—Will not be kept up separately from general spot map, in view of the fact that lightning spot maps by ranger districts are kept.								
Visibility maps.—Work ahead is to secure refinement in the maps which show the seen and unseen areas. For present, Koch profile maps will be completed and checked in field for all occupied points. There are still about 15 points which need maps. Performed by rangers. Some instruction and review by supervisor's staff at time of preparation. Further inspection as to accuracy in connection with regular inspection of guards.	12 (1930)	Feb.	1	3			1	3
Organization maps.—Supervisor's staff prepares original and sends to regional office for copies.		May.		2				2
Special telephone map.—Supervisor's staff prepares original and sends to regional office for prints.		Jan.		2				2
A. to K. sheets.—Entries made by member of supervisor's staff or detailed man—really clerical after individual fire reports are prepared.		Jan.	12				12	

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

OPERATION—Continued

Major activities and their elements	Perfection and intensity Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Written fire plans	*Ranger district fire control plans.*—To be revised annually—bring maps up to date. Review experience past season and determine changes to be made in organization, plan of action, etc. 16 districts at 1½ days each.	6	Winter.	9						9	
	Organization chart.—Prepared by ranger and reviewed by supervisor's staff.	6	May.		1						1
	Organization chart for fire protection on sales.—Prepared by officer in charge and reviewed by supervisor.	6			1						1
	Written agreements.—Are made between the project salesmen and the district ranger in whose district the sale is located, defining responsibilities of each in case of fire on the project area. Reviewed and filed by supervisor.	6			1						1
	Written instructions to individuals.—Are given to each fireguard, improvement crew foreman. Prepared by rangers and typed in supervisor's office. 1 of each class on each district reviewed by supervisor's staff.	18			3						3
	Firesigns.—										
	Fire cooperation.—All private lands inside the forest and a considerable acreage outside and adjacent is included in the so-called Shoshone protective district, fire protection in which is handled by the Service in accordance with agreement with the State forester. Assistant supervisor acts as warden.										
	Ownership records.—Record is kept on plats. (See Lands.)										
	Collections.—Bills are prepared and submitted to 6 large owners in spring by clerk (3 hours), other owners are covered by assessment list. Sent to State forester by Sept. 15. Can be done by clerks after ownership record is secured.				1						1

Review and certification by supervisor's staff.			1						1	
Slash disposal.—Enforcement of State slash disposal laws on private lands within the district. Notices sent and follow up performed by rangers, also, final inspection and clearance.										
About four complaint cases taken up by supervisor's staff each year involving special trips.	4				1		1		2	
About one case of failure to comply with law each year, requiring trespass—has been handled by supervisor's staff but can be done by rangers in the future.										
Review report and conference with trespasser by supervisors staff.	1			4						4
Northern Pacific Ry. Co.—landowner.—Company sends ownership lists each spring which require changes in unit percentages used as basis for distribution of suppression charges.				4						4
Special report is made each winter showing basis of charges for suppression—by clerk and supervisor's staff.				4						4
Closing forest to building camp fires or entry.—Supervisor's staff prepares advertisements and instructs rangers.		July.		3						3
Law enforcement.—Supervisor's staff participitates in most difficult cases. Balance handled by rangers. Total 10 cases—supervisor participates in.	2			4						4
Reviewing and submitting law enforcement reports (from ranger).	8			1						1
Presuppression hiring of guards.—(See Employment below.)										
Guard training.—Training camp held in each R. D. About 25 gds. and improvement men at each camp. A member of supervisor's staff attends each camp. 3-day camps.	6	June.			18		3		21	
Preparing for gd. training camp instruction.—2 of supervisor's staff at one-half day each.		May.	1						1	
Guard inspection.—Supervisor will make a thoroughgoing inspection of 50 per cent of the Guard Stations on the forest each year. (Total approximately 66.) This percentage will be varied if necessary to conform with the ranger's trip plan.	33	G. I.			3	2	13		21	21
Improvement crew inspection of preparedness.—(Inspection incidental to trail inspection. See below.) Total 20.	10									
Tools and equipment.—50 per cent of the fire tools caches will be inspected by the supervisor's staff each year.									x	
Training camp for fire foremen.—Training in fire suppression for foremen of crews. 1 camp, of 3 days. Camp held at regular station and camp prepared by rangers.	1	June.			3				3	
Preparation for instruction at camp and planning layout, by supervisor's staff.		May.		4	1				1	4
Per diem guards.—Handled by rangers. Adequacy checked by supervisor's staff when reviewing fire plans.										

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

OPERATION—Continued

Major activities and their elements	Perfection and intensity / Local standards of / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Suppression	*Dispatching—sitting tight.*—Each ranger district has an alternate and normal dispatching will be handled from each district's headquarters. During periods of critical fire danger, 1 member of the supervisor's staff will keep in touch with the situation and dispatch and coordinate the fire work for the forest as a whole, and as a matter of proper supervision will discuss situation with rangers daily during such period.	About 20 days.	July and Aug.		6						
	Have average of 2 lightning breaks each year which require about 1 day each for supervisor's staff in dispatching. These occasions require the most exacting supervisory analysis and action.	2	11	2						2	
	Have average of 8 class C fires annually, an average of 4 of these requires one-half day time in dispatching and coordinating by supervisor's staff.	4	11	2						2	
	Discussion with rangers and making of decisions and taking action in placing of emergency guards, etc.		11	2						2	
	Field work on fires.—Supervisor or his staff members will inspect and analyze grade of work and constructively comment upon findings of as many class A and B fires as practicable, hitting at least 50 per cent, but not more than 5 if that number occurs annually within the so-called danger zone of each ranger district. In addition, if possible, they will hit every fire located in dangerous situations that may not be mopped up to point of safety within the first work period.										
	Estimated volume of work.— Of 8 class C fires— 2 in light danger zones; no trip made. 2 will be held during first period; time, 1 day each. 4 will require 4½ days on job and 1 day travel each. Total, 5½ days each. Of class B fires— 5 will be in high danger zones and will require trip by supervisor's staff; 1 day each, including travel.										
	Time required for regular inspection of class A and B fires	25	July and Aug.			1	5	6	2	7	7

	Time required for threatening class B fires	5	July and Aug.			2	3	5		
	Time required going to 6 class C fires, which do not promise to be mopped up in the first work period: 1 day each for 2 (1 travel) 5½ days each for 4 (6 travel)	2	July and Aug.			1 18	1 4	2 22		
	Damage appraisal.—Field work performed by rangers and project men, except where high-grade appraisal is needed for court cases. (See Form 929 reports below.) These are infrequent.									
	Inspection and completion of individual fire reports.—Reports will be checked by executive assistant or clerk for accuracy and completeness. Administrative check by supervisor's staff for possible trespass cases, character of action on the fire, etc.	98		2				2		
	Annual fire reports.—Will be prepared by executive assistant with limited amount of supervision by supervisor's staff. (Form 926).		Nov.	1				1		
Improvements plans	*5-year plans of permanent improvements.*—Revised every 3 years. (In 1930.) Some special information required in connection with annual allotment estimates. (See below.)	1 in 3 years.	Feb.	1				1		
	Revision of telephone plan map.—Annually.	1	Feb.		2				2	
	Form 428.—Will be abolished July 1, 1931, and combined in accounts books.									
	Description of new projects undertaken.—Furnished by or reviewed by supervisor's staff.	25–30	Dec.	1				1		
	Building plans and specifications.—Regional standard plans and specifications used except in unusual cases.									
	Layout plans.—Completed.									
	Maintenance.—Handled entirely by field force. Inspection by supervisor's staff in connection with general inspection.									
	Construction.—Construction projects are handled under supervision of rangers—inspection by supervisor's staff. Supervisor will inspect sufficiently the construction projects under way at the time of his regular inspection trip to enable him to judge whether the specifications and requirements are being met. Average—6 L. O. and fireman structures. 10 telephone projects. 6 headquarters improvement projects. Will inspect 50 per cent on the average	11	G. I.			3	2	2	3	4
	Building locations and layout.—Will be checked on the ground in case of lookouts, towers, and lookout firemen's cabins, by supervisor's staff in advance of construction. Done in connection with general inspection.	6				1	4	3	1	

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

OPERATION—Continued

Major activities and their elements	Perfection and intensity / Local standards of / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Trails	*Plans.*—Revision of trail plan map and project list will be made annually.		Feb.		6						6
	Revision of progress map is made up from maps submitted by rangers. Usually by assigned project men.		Feb.		3						3
	Specifications.—Will be made up for each project to consist of the general specifications for way trails with such additions as are needed to define the work to be done. General specifications prepared by ranger and reviewed and approved by supervisor.	54		1	2					1	2
	Location.—Performed usually by rangers personally—sometimes by qualified assistants. Supervision and inspection included with construction inspection below.	200 miles.									
	Construction.—Performed under supervision of ranger. Inspection by supervisor's staff at time of general district inspection. Supervisor's staff will inspect at least 1 trail crew in each ranger district and need not ordinarily inspect more than 2.										
	Average of 3 crews on each district.	9 (of 18)	G. I.			2	2	3	6	6	
	Trail traverses.—Will for the present be limited to surveyed timber-screened country and to marking the intersection of trails with section lines and determining and marking distance to section corners. (See Administrative Guide for marking distances to section corners to be determined by pacing and location of trail between intersections to be shown by free-hand sketching.										
	3 crews, one man each, next year to bring up old work, and trail foremen will mark intersections, and ranger will sketch trail. If this is not practical the work may be projected.										
	Forwarded to regional office when map revisions are made, annual check-up of work done, etc.				2						2
	Supervision and inspection incidental to regular inspection of ranger district.				x						x

Roads	*Plans.*—Map B—Recommendations for changes, including descriptions, needed standards, etc., prepared and submitted to regional office by supervisor. (For next year or two new projects added to program will be restricted to those on which it is desired to begin work during the next year.) *Location.*—On projects which will be undertaken within next 2 or 3 years the location will be performed by the supervisor's staff with such assistance as needed. About 10 miles *Construction.*—An average of two 10-man crews each year. Member of supervisor's staff to be present and instruct men at time each crew starts—about 2 days with each—work carried on from May 15 to Nov. 1 on basis of 1 old and 1 new foreman. On first project—experienced foreman. 1 inspection every month after start. Each inspection involves 8 hours on job. Superviser inspects spring work on Lakes and Forks Districts. On second project—new foremen. 1 inspection every 10 days for first 2½ months. 1 inspection every month thereafter. For first 2½ months every other inspection will take 1 day and the others one-half day each. Monthly inspections will require 1 day each. Experienced crew days: May 15 Job 1.4 Travel 0.4; 25 --- ---; June 5 --- ---; 15 .4 .2; 25 --- ---; July 5 --- ---; 15 .4 .4; 25 --- --; Aug. 5 --- ---; 15 .4 .2; Sept. 5 --- ---; 15 .4 .4; Oct. 5 --- ---; 15 .4 .2; Total 4.0 2.2 New crew days: May 15 Job 1.4 Travel 0.4; 25 .4 .4; June 5 .4 .44; 15 .4 .4; 25 .4 .4; July 5 .4 .2; 15 .4 .4; 25 .4 .2; Aug. 5 .4 .4.; 15 --- ---; Sept. 5 .4 .4; 15 --- ---; Oct. 5 .4 .4; 15 --- ---; Total 6.4 4.4 6 hours round trip to 1 project and 3 hours round trip to the other The above line-up contemplates that all work of both crews will be under the direction of the supervisor with just ordinary inspection by the regional office.									
Signs	Requisitions for road and trail signs are reviewed by supervisor's staff and summary made up and sent to regional office.	25	Nov.		2					2
Miscellaneous	Administrative action in expediting the securing of repairs for machinery.			1					1	
		Nov.		1					1	
		Oct.				10		1	11	
		C. I.					4	1		5
						10	4	6	6	17	.2

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

OPERATION—Continued

Major activities and their elements	Perfection and intensity of Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Road current cost and progress reports	To be submitted every 10 days. Reviewed and digested by supervisor's staff.		May 1 to Nov. 1.	2						2	
	Two projects.	32									
Recapitulation report	To be prepared at end of season.		Dec.	1						1	
Road and trail expenditure and progress report	Prepared by clerk. Reviewed and approved by supervisor.		Dec.	1	1					1	1
Finance	*Allotment estimates.*—Rangers submit written estimates, followed by conference with supervisor's staff. (It will be the policy to reduce the written work by rangers in connection with allotment estimates to the minimum and to cover most of the questions in conference.) Review of written estimates and conferences with each ranger.	6		3						3	
	Preparation of material for forest estimates.			9						9	
	Making allotments to rangers—mostly by clerks from information already prepared.			1	4					1	4
	Budget conferences.—Between members of regional office and supervisors are held annually.					1		4		1	4
Accounts	*Forms 44.*—Prepared by clerk, reviewed and approved by supervisor, and forwarded to regional office.		Jan.		1						1
			Apr.		1						1
			Aug.		1						1
			Oct.		1						1
	Expenditure and balance statement.—Is prepared in June by clerk and reviewed and plan of expenditures worked out by supervisor.		June.		4						4

	Review and approval of vouchers.—Supervisor will check and approve all expense accounts and questionable vouchers and at least 20 per cent of all other vouchers selected arbitrarily, and in so far as possible, at weekly intervals. (Average number of vouchers annually, 1,800.) (Average expenditures, exclusive of insect control, $220,000.) Expense accounts take 5 minutes (60). Other accounts average 1 minute (400).	400	All year.	1	5					1	5
	Clerical work.—The supervisor will at least annually make a systematic inspection and check of the work performed by or under the direction of the executive assistant, including files, surplus supplies.			2						2	
	Central warehouse.—Handled under direction of executive assistant. Should be inspected and directions given for disposal of surplus supplies and useless property condemned. Once each month.		All year.	1	5					1	5
Personnel control	*Recruiting.*—At present there is a buyers' market on new employees. Attention by supervisor's staff is given in connection with inspection trips and other regular work. Permanent positions except clerks are filled from outstanding men in temporary force.										
	Ranger civil service examination.—Handled by civil service examiner. Supervisor's staff prepares confidential statements on each applicant.	5	Oct.		1						1
	Clerical rating.—Prepared semiannually by supervisor's staff. (3 clerks.) Conference with executive assistant, looking up information, preparation of rating sheet, and conference with employee.	6	Nov. May.		3 3						3 3
	Personnel ratings and No. 418 reports.—Preparation of ranger ratings and No. 418 reports, and preparation of letters to and conferences with employees. Ranger No. 418 reports—16 at 1 hour each. Preparation of rating by supervisor and 2 assistants—4 hours each. Conference on ratings—1 daily—3 men. Preparation of No. 418 reports for other than rangers. 3 at 1 hour each. Time for above: Supervisor. Other staff men.	3	 Mar. Mar.	 4 (3)	 	 	 	 	 	 4 (3)	
	Training.—Do not plan on putting brand new men in charge of ranger districts. Men transferred to the forest or placed in charge of a district for the first time will be given five days' training and instruction on the district by supervisor's staff man to be followed by an inspection in six weeks, following the route and subjects of a general inspection trip. One change in district rangers in the last three years. Salesmen are given training and get experience through assignments to subordinate positions on sales before they are placed in charge of a project sale.	1/3				2				2	
	Study courses.—Correspondence study courses, regional office, service, or others of value to officers in improving their work are encouraged. Personal time will be used in pursuing such courses.										

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

OPERATION—Continued

Major activities and their elements	Perfection and intensity / Local standards of / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Personnel control	*Staff training by supervisor in field.*—Annually the supervisor will have 1 of the staff men accompany him on 1 of his inspection trips in the interest of coordinating the quality of output and inspection technique and administrative aims.					3		1		4	
	Group training of staff officers.—1 regional training camp for staff men will be held annually. Average of 1 man from Coeur d'Alene will attend each year. (A development item.)	1	Apr.			14		2		16	
Miscellaneous	*Ranger meetings.*—A general ranger meeting is held each year at supervisor's headquarters.	1	Mar.	2						2	
	Ranger district analysis.—Original analyses have been completed. Annual revision by ranger in consultation with the supervisor's staff.	6	Feb.	12						12	
	Supervisor's job analysis.—Annual revision.	1	Feb.	3						3	
	N. R. Analysis of sales work.—Project sales work will be analyzed in similar manner to ranger district work and a plan for handling developed: 3 days for 2 large sales (each). 2 days for 2 medium sales (each). 1 day for 2 smaller sales (each).	6	N. R.	(12)						(12)	
	N. R. Analysis of clerk's work.—To be made by Jan. 1, 1932.	1	N. R.	(7)						(7)	
	Review of ranger monthly follow-up reports.—Made by supervisor's staff.	72	Y. L.	1	5					1	5
	Review of compliance with ranger plan in field.—While on general inspection trips, check will be made on the compliance with the ranger trip plans—using diary for past month.				1	4				4	1
	Annual review of compliance with ranger plans.—Will be made at time plan for ensuing year is prepared, from diary analysis.	6	Feb.	6						6	

Monthly revision of supervisor's work plan.—Consideration of new jobs to be undertaken, assigning to staff members, trip schedules, etc.										
Supervisor.	6	Y.L.	1	4					1	4
Two assistants.		Y.L.	(1	4)					(1	4)
Condition of quarters and office at ranger district headquarters.—Orderliness, sanitation, condition of files and equipment, surplus supplies and equipment, etc., will be checked on general inspection trips.	6	G.I.	1	6					1	6
General inspection.—General inspection is the aggregate of thoroughgoing inspection of individual activities, headquarters and office layout, and observance of the intangibles that enter into an acceptable standard ranger district administration.										
One general inspection will be made of each ranger district during each field season. The time of each job to be performed is shown under the various activities. A summary is shown in the appendix. The total time required for each district is shown below.										
(For this forest the inspection season is June 10 to Sept. 30, as guard camps start about June 5. The general inspection time may be prorated in this period.)										

District:	Total time Job	Travel
Coeur d'Alene	4.0	4.1
Forks	5.0	4.5
Grizzly	4.6	4.2
Lakes	6.2	4.4
Shoshone	5.2	4.1
Little River	4.6	3.0
Total	30.0	24.5

Total number days, 54.5.

The general inspection time is made up of the time for the several jobs done on these inspections. (See Appendix.)										
Considering the various activity quantitative inspection standards set-up, and desirable progressive travel, general inspection trips will usually involve covering about 50 per cent of the area of each ranger district. The routes of travel for such trips will be varied so that each part of the district will be covered at least once in 3 years.										
Trouble shooting.—Special inspection trips on unforeseen jobs..	All.									
One day per month.						6		6	12	
Interforest travel.—Annual visit to some other forest for purpose of improving practices and becoming familiar with different methods of handling work.		1	Oct.			4		2	6	
Special project reports.—Estimated that there will be 1 report, such as, public domain, personnel classification, etc., and 1 lesser report each year.		2		6					6	
Quarterly requisitions for equipment and supplies.—3 separate parts to each requisition. Made up by executive assistant and reviewed by supervisor's staff.		4			2					2

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

OPERATION—Continued

Major activities and their elements	Perfection and intensity / Local standards of / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Miscellaneous	*Cost data.*—Analysis of activity and unit costs and project costs, and taking action thereon. Including— General activity and unit costs. Motor vehicle costs. Project sales costs. Improvement costs. Land exchange costs. Fire-control costs. Timber survey costs.			2						2	
	Annual statistical report.—Prepared by executive assistant and checked and approved by supervisor.				3						3
	Personal equipment contracts.—Preparing new contracts for permanent employers.	1									
	Reviewing contracts and reappraising annually.	14									
	Preparing new contracts temporary men.	6									
	Total time				2						2
	Compensation for injury.—Mostly done by ranger and executive assistant—occasional case requires attention by supervisor.										
	Total, 62 cases per year, 10 per cent require action by supervisor.	6		2	4					2	4
	M. P. O. E.—All on personal time.										
	E. & S. other than quarterly requisitions.—Equipment requisitioned by field men mostly in annual requisitions. Checked and approved by supervisor's staff.			1						1	
	Mules and horses have been purchased by supervisor's staff, but will be handled through central purchase in the future.										
	Supplies subsistence.—Requisitions submitted by field men—checked and approved by supervisor's staff.			1						1	
	Mostly covered by requisition on June 1 and July 1.										

Central purchase requisitions and purchase orders handled by executive assistant.											
Hiring temporary employees.—Number of men employed approximately as follows: Protection guards 85 Roads and trails 85 Other improvements 10 Brush disposal Mostly gyppos. Sanitation crews 50 Planting crews (spring and fall) 50 Temporary scalers 3 Insect control 100 Emergency guards 20											
	Supervisor's office	Rangers									
Protection guards—February to June	25	60									
Improvement men—February to June	25	60									
Other improvement—February to June	5	5									
Sanitation crews—June	30	20									
Planting crews—spring—April	50	--									
Planting crews—fall—September	50	--									
Temporary scalers—June and July	3	--									
Insect crews—March, April, and October	100	--									
Fire fighters—July and August	100	50									
Emergency men—July and August	20	--									
Most of hiring by executive assistant, with instruction and supervision by supervisor's staff. Supervisor's staff hires road foreman, new trail foremen, and temporary scalers. Total about 15 men.				4						4	
Conferences and visitors.—The supervisors staff will handle all callers which can not or should not be handled by the executive assistant. The set-up here is in addition to time provided under separate activities. Supervisor has averaged one and one-ninth callers for 43 minutes per day while in office. Seventy per cent, or 1 caller for 30 minutes per day while in office, were not related to the "separate activities."	Y. L.										
The two staff men have averaged 3 callers for 55 minutes per day while in office. Thirty per cent, or 1 caller for 20 minutes per day, were not on "separate activities" such as hiring men. Total of above: Net—2 callers for 50 minutes per day while in office.											
With nonfield (supervisor or staff) of 25 days per month at 50 minutes=3 days per month.				36		S. S.				36	
Supervisor's conferences with forest officers and staff.—1 hour per day while in office—10 days per month.	10 hours per month.			17						17	
Staff conferences with forest officers, etc. Forty minutes per day while in office—15 days per month.	10 hours per month.			(17)						(17)	
Telephone calls.—Supervisor and staff—5 hours per month. (Based on 30 per cent of all calls totaling average 15 hours per month in July and August, 1930.)		Y. L.		8	4					8	4

SAMPLE—JOB-LOAD ANALYSIS, PART 1—Continued

OPERATION—Continued

Major activities and their elements	Perfection and intensity / Local standards of / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip: Nonfield Days	Nonfield Hours	Field: Job Days	Field: Job Hours	Field: Travel Days	Field: Travel Hours	Total Days	Total Hours
Miscellaneous	*Visiting officers and notables.*—The supervisor and regional office men will attempt to arrange their schedule so that there will be the minimum of interference and lost time on the part of either. Some "special" trips will be required for which time needs are: Total 62 days (if several together counted as 1), approximately 50 per cent "special" time=30 days. 5 days per month in field season.		Dec.	30						30	
	Base map corrections.—Compiled by detailed man.										
	Survey corners found.—Posted by detailed field man.										
	Correspondence.—Incoming mail will be passed through the executive assistant and only that which he can not handle passed on to the supervisor. **(All letters reduced to single space, full pages.)** Reading: (Trial runs averaged 1.85 minutes per page; use here 3 minutes per page.) Supervisor reads 90 per cent.	941 pages, Y. L.									
	Summer, June 1–Sept. 30: 60 of 65 pages at 3 minutes=3 hours per month.		Summer.	5	1	S. S. only.				5	1
	Winter, Oct. 1–May 31: 77 of 85 pages at 3 minutes=4 hours per month.		Winter.	6	6	S. S. only.				6	6
	Reading bulletins: 2 minutes per page=4 hours per month.	1,400 pages.	Y. L.	6	6	S. S. only.				6	6
	Outgoing mail.—Dictating and otherwise handling outgoing mail which can not be handled by the clerks. 29 pages (summer) at 20 minutes per page. 46 pages (winter) at 20 minutes per page.	487 pages, Y. L.									
	10 hours per month (summer).		6/1–9/30.	5	5	Both supervisor and staff				5	
	16 hours per month (winter).		10/1–5/31.	18	2	Both supervisor and staff				18	2
	Reading department—printed—bulletins, trade journals, etc.: 1 hour per month (summer).				4						4
	2 hours per month (winter).				8						8

Form 576w

SAMPLE—JOB LOAD ANALYSIS, PART 1

Engineering

Objective:

Coeur d'Alene Forest
Plan made October, 1930, by ——

Major activities and their elements	Perfection and intensity Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
	Water-power permits.—Consist primarily of transmission lines, involving timber settlement and report, is similar to special use case. Field work will be handled by rangers or men in charge of sales. Report approved by supervisor and transmitted to regional engineer for further action.										
	New cases.	1	Y. L.		2						2
	Supervisor submits annual report, based on ranger's reports, to regional engineer.	16	Dec.		2						2

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Form 576w

SAMPLE—JOB LOAD ANALYSIS, PART 1

Public Relations

Objective: In addition to the items set up under the various activities.

Coeur d'Alene Forest.
Plan made —— by ——.

Major activities and their elements	Perfection and intensity	Local standards of	Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
						Nonfield		Field				Total	
								Job		Travel			
						Days	Hours	Days	Hours	Days	Hours	Days	Hours
	Contacts.—County attorneys, U. S. commissioners, editor of paper, sheriff, etc., exclusive of office conferences as shown below:												
	Coeur d'Alene.			6			3						3
	Wallace.			6					3				3
	Kellogg.			4					2				2
	Service club.—Attendance at meetings when in town:												
	1 hour per month.					1	5					1	5
	Miscellaneous out-office conferences with.—Influential citizens and others:												
	1 hour per month (summer).						5						5
	2 hours per month (winter).					2						2	
	Movie campaign.—Pictures shown annually—handled by rangers. Plans and general direction by supervisor's staff.				Feb.			2				2	
	Prepared talks.—About 6 annually (2 at Coeur d'Alene and 4 out of town).			6									
	Preparation.					3						3	
	Giving talks.						2		4	1	4	2	2
	Interviewing reporters.—See Conferences.												
	Newspaper articles.—												
	3 current articles.			3			6						6
	1 special article.			1	Winter.		4						4
	Casual interviews.—With people met while on trips is covered by time set up for inspection.												
	Show-me trips.—1 trip annually by supervisor's staff in addition to that done by rangers. May be tied in on regular trip.			1	Oct.			1			4	1	4

Settler fire cooperation.—Supervisor's staff will give demonstration to rangers in securing fire cooperation where that is needed—estimate 1 on 3 districts.	3					6				6
Fire cooperation—logging companies, etc.—Some cases require attention by supervisor.	4				1				1	
Items for regional and service bulletins.—Supervisor's staff will submit about 6 per year or 1 hour per month.		Y. L.		6						6

Form 576w

SAMPLE—JOB-LOAD ANALYSIS, PART 1

Range Management

Coeur d'Alene for
Plan made —— by ——

Objective:

Major activities and their elements	Perfection and intensity	Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
					Nonfield		Field				Total	
							Job		Travel			
					Days	Hours	Days	Hours	Days	Hours	Days	Hours
	Permits issued..... 20 Number C. and H.. 135 Number sheep..... 8,000	6 owners.										
Applications.—Sheep applications received in person by supervisor's staff in conference except 1. Usually is followed by field examination; will ordinarily be shown range by ranger. Cattle and horse applications mostly received by mail.				Mar.		7						7
Approval of applications.—O. K. by supervisor's staff showing periods, fees, etc. Letters of transmittal made in supervisor's office by clerk. Permits prepared at time of making letter of transmittal.				Apr.	1	3					1	3
Range inspection.—40 per cent of the divisions are to be inspected annually. This will be met by inspection of 1 range on each of four districts, during general inspection of district.				G I			1	6			1	6
Trespass.—15 cattle owners turn a small number of stock on range without permit. Estimated 100 head. Rangers will make fee-lot count in late winter and issue exempt stock permit and take application for excess. Supervisor's staff will help work out difficult cases.				Apr. and Mar.				5 5		3 3	1 1	
Management plans.—Current revision of unit plans to be done by ranger with guidance from supervisor's staff.			4	Jan.	1						1	
Annual report.—Form 438—statistical sheet prepared by supervisor's staff—on memorandum report from ranger.			1	Nov.	1						1	

Herbarium.—Will be added to by rangers or other field men. Supervisor's staff handles correspondence.											
Fish and game.—Fish planting handled by rangers.											
Game law enforcement.—Supervisor's staff participates in prosecution of violators. Rangers send in to supervisor's office violators apprehended on the forest. If deputy State game warden not available, prosecution handled by supervisor's staff.	8		1	1					1	1	
Game organizations.—Supervisor's staff called upon to spend official time in fish and game matters.		Out of peak.	1						1		

Form 576w

SAMPLE—JOB-LOAD ANALYSIS, PART 1

Lands

Objective:

Coeur d'Alene forest.
Analysis made October, 1930, by E. L., E. K., M. H. W., C. W., C. S. S., C. D. S.

Major activities and their elements	Local standards of Perfection and intensity	Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
					Nonfield		Field				Total	
							Job		Travel			
					Days	Hours	Days	Hours	Days	Hours	Days	Hours
Special uses	*Existing uses.*—Supervisor will inspect 15 per cent of special uses in effect each year. Concentrating especially on resorts, residences, and similar uses where difficulties may arise or there are questions of policy. 56 in effect 1929.	9 per year.	G. I.				3				3
	399 reports submitted annually by rangers will be reviewed.	56	Nov.			2					2
	New uses.—Applications received largely by supervisor and referred to ranger for examination and report.	8 (6 by supervisor.)	May or June.			2					2
	1 case will require field examination by supervisor.	1					3				3
	Supervisor approves reports and issues permits.	8				4					4
	Easements.—New cases infrequent. Cases in effect. Supervisor's action negligible.	8										
Recreation	*Recreation plan.*—Primarily a camp-ground plan. Plan should be made for forest.											
Nonrecurrent	Should include: (1) A comprehensive camp-ground plan.	18	May	1		6				7		
Recurrent	and (2) Detail plan of most urgent camps.	3	May	1	5	2	2		4	4	3	
	Camp grounds.—Improvements will be handled by ranger. These will be inspected by supervisor along with inspection of camps. One inspection of improved grounds in connection with general inspection, and one inspection incidental to special trips.	3 new.	G. I.				4					
	In addition, supervisor's staff will take advantage of current opportunities to observe camp ground conditions.	Average 9.	G. I.				5					
Claims.	*Homestead cases.*—Negligible.											

	Mineral claims.—Applications forwarded to ranger for examination and report. If questionable, reexamined and reported on by mineral examiner. Supervisor reviews and approves reports.	10	Y. L.		3						
	Classification and settlements.—Infrequent applications are received for tracts classified as nonlistable. Usually disposed of in supervisor's office without field work.	1	Y. L.		1						
	Boundaries and public domain.—Reports submitted, but further nonrecurrent jobs may appear. Indefinite.										
	Status and ownership record.—Current changes will be entered in supervisor's office by clerk and any big or nonrecurrent jobs will be done during winter by detailed rangers or salesmen.										
Land exchange.	Make special effort to secure real progress in exchange work. Objective will be to submit reports to regional office covering 6,000 A. annually, estimated to be 20 cases.	6,000 A., 20 cases.									
	Negotiations will be undertaken with 25 to 30 owners. At least 80 per cent are believed to be nonresidents of the county in which the land lies.	20	Y. L.	3					3		
	This means negotiations with them will be by correspondence. About 4 letters needed in each case. Local residents will be interviewed. Plan to have rangers handle 50 per cent of these; balance by supervisor.	5	Y. L.		6					6	
Field examinations and reports.	Regular practice will be for the rangers to examine cases under 320 A. Supervisor's staff will examine cases, 320 A. or over, partly on crew basis. On tracts over 400 A. a man should cover 200 A. per day. On smaller tracts 160 A. is average day's work.	10 cases, 4,000 acres.	Apr. May Oct. Nov.	7		15		5	27		
	Review and approval of reports.—All cases to be reviewed before submission to Regional forester.	20	Y. L.	1	3				1	3	
	Assistance to proponent in completing case after informal acceptance by General Land Office.—Advise proponent of approval and furnish formal application. Notify of fees due and furnish affidavit of qualifications. Explain advertising. Explain submission of deed and abstract. In some cases assist in clearing abstract of title.	20	Y. L.	4					4		
	Annual revision of land-exchange plan.—		Dec.		4					4	

Form 578w

SAMPLE—FOREST SUPERVISOR'S TRIP PLAN

General Inspection—Coeur d'Alene District

Month ——.

Coeur d'Alene Forest.
Plan made —— by ——.

Assigned to—	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
		Trip No. 1:								
		Coeur d'Alene to Wallace R. S.						3		
		Wallace to Sunset L. O. Inspect and return.				2		4		
		Wallace to Snowstorm Peak. Inspect lookout.				2		6		
		En route inspect Elsie camp ground.				1				
		En route inspect small sales—Pottsville and Elsie R. S.				2				
		En route inspect special use.								
		Wallace to Graham Mountain via Montgomery R. S., car and horse. Inspect lookout.				2		3		
		En route inspect timber sale—Montgomery Creek cooperation, brush.				2				
		En route inspect trail crew—Graham ridge.				2		1		
		Graham Mountain to head of Moon Creek. Inspect lookout.				2		2		
		Moon Peak to Montgomery R. S., via Browns Gulch.						2		
		Inspect improvements at Montgomery R. S.				2				
		Montgomery R. S. to Wallace.								
		En route inspect camp ground at Moon Creek.								
		En route inspect class A and B fires. (4.)				2		8		
		En route inspect new improvement constructions.				4				
		En route determine location of new improvements.				2		1		
		En route show ranger regarding fire cooperation.				2				
		At ranger station—review ranger plan compliance.				2				
		Headquarters inspection—files—equipment, etc.				2				
		Wallace to Coeur d'Alene.						3		
		Total			4		4	1	8	1

Form 578w

SAMPLE—RANGER DISTRICT TRIP PLAN

General Inspection—Forks District

Month ——.

Coeur d'Alene Forest.
Plan made —— by ——.

Assigned to—	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
		Trip No. 1.								
		Coeur d'Alene to McGee R. S.						4		
		Leave McGee to Faucett Peak, via Independence Creek. Inspect lookout. Saddle Horse.				2		5		
		En route inspect Independence sheep range.				3				
		Faucett Peak, to head of Spruce Creek second lookout. Inspect.				2		2		
		Head of Spruce Creek to Beaver R. S. Inspect fireman and alternate.				2		3		
		En route inspect 3-man trail crew.				2				
		En route inspect Spruce Creek sheep range.				3				
		Beaver R. S. to Beaver Peak. Inspect lookout.				2		1		
		Beaver Peak to East Fork guard station, via Pend Oreille Divide.				2		4		
		En route inspect Beaver Peak sheep range.				3				
		East Fork station to McGee R. S.						5		
		En route inspect Teepee camp ground.				1				
		En route inspect Teepee Creek road crew.				2				
		En route inspect class A and B fires. (4.)				2		8		
		En route inspect new improvement constructions.				4				
		En route inspect camp ground improvement.				1				
		En route determine location of new improvements.				2		1		
		En route inspect McGee road maintenance.				1				
		At ranger station—review ranger plan compliance.				2				
		Headquarters inspection—files—equipment, etc.				4				
		McGee R. S. to Coeur d'Alene.						4		
		Total.			5		4	5	9	5

Form 578w

SAMPLE—RANGER DISTRICT TRIP PLAN

General Inspection—Grizzly District

Month ——.

Coeur d'Alene Forest.
Plan made —— by ——.

Assigned to—	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
		Trip No. 1:								
		Coeur d'Alene to Graham R. S. (Carter).						4		
		Leave Graham station for Grizzly Mountain, via Brown's Gulch. Inspect lookout.				2		6		
		Grizzly Mountain to Half Way L. O. Inspect.				2		2		
		En route inspect Can Creek trail crew.				2		1		
		Half Way to Grassy Peak L. O. Inspect.				2		2		
		En route inspect Grizzly Mountain motorway.				4				
		Grassy Peak to Teepee Peak. Inspect second lookout.				2		2		
		Teepee Peak down West Fork of Steamboat to Forks. Inspect fireman.				2		2		
		En route inspect trail crew on Steamboat.				2		1		
		Forks of Steamboat to Graham R. S.						3		
		En route inspect 1 special uses—agriculture.				1				
		En route inspect 1 small sale.				1				
		En route inspect Steamboat and Big Jam camp grounds.				2				
		En route inspect class A and B fires. (3.)				2		6		
		En route inspect new improvement constructions.				4				
		En route determine location of new improvement.				2		1		
		En route inspect Boro cooperation brush.				2				
		At ranger station—review ranger station plans compliance.				2				
		Headquarters inspection—files—equipment.				4				
		Graham R. S. to Coeur d'Alene.						4		
		Total.			4	6	4	2	9	

Form 578w

SAMPLE—FOREST SUPERVISOR'S TRIP PLAN

General Inspection—Lakes District

Coeur d'Alene forest.
Plan made —— by ——.

Month ——.

Assigned to—	Trip dates	Trip and job description	Time							
			Nonfield		Field				Total	
					Job		Travel			
			Days	Hours	Days	Hours	Days	Hours	Days	Hours
		Trip No. 1:								
		Coeur d'Alene to Mount Coeur d'Alene via Turner Creek L. O. Inspect.				2		2		
		En route make phenological observations.				1				
		En route inspect Beauty Creek road work done.				2		1		
		To Red Horse L. O. Inspect and return to Turner Creek.				2		3		
		By car on N. and S. Highway to Carlin Creek.								
		Inspect sheep range.				4				
		En route inspect way-trail crew.				2				
		To Springston by car. Inspect guard.				2		1		
		By car to Harrison Flats to Rose Lake guard. Inspect.				2		2		
		Down north of river to Frontier Creek—Colburn sale. Inspect.				4		1		
		Up to Cataldo and LeTour Creek. Inspect Higbee slash.				2		1		
		Higbee's to Bogle's slash job.				2		1		
		Bogles to another Bogle slash in Mason Creek. Inspect.				2		1		
		Mason Creek to 4th of July Summit.								
		Inspect special use (1) and camp grounds (1) on Summit.				2				
		Walk to Copper Mountain and return. Inspect lookout.				2		4		
		Continue to Coeur d'Alene.						1		
		En route show rangers method of securing cooperation.				2				
		En route inspect camp ground improvement.				1				
		En route inspect class A and B fires.				4		16		
		En route inspect new improvement constructions.				4		2		
		En route determine location of new improvements.				2				
		En route inspect another slash job.				2				
		En route inspect small sales.				2				
		At ranger station—Review ranger plan compliance.				2				
		Headquarters inspection—files, etc.								
		Total,			6	2	4	4	10	6

Form 578w

SAMPLE—FOREST SUPERVISOR'S TRIP PLAN

Ranger District General Inspection—Shoshone Ranger District

Coeur d'Alene forest.
Plan made —— by ——.

Month ——.

15 stations for guards. 204 M acres, area of ranger district.

Assigned to—	Trip dates	Trip and job description		Time							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
		Trip No. 1:	Horse-travel miles								
		Coeur d'Alene to Prichard via car.							} 5		
		Prichard to Big Creek via speeder.									
		Inspect guard at Big Creek. Pick up horses.					2				
		Big Creek to Hawk R. S. Inspect guard.			7		2		2		
		To small sale on Haystack Creek.			3		1		1		
		Sale area to Pond Peak. Inspect guard.			12		2		4		
		Inspect one trail crew en route, extra travel off route.			3		2		1		
		Pond Peak to Rock City. Inspect guard.			6		2		2		
		Rock City to Bennett Ridge. Inspect guard and return to Rock City.			7		2		2		
		Rock City to Yellow Dog. Inspect guard.			8		2		2		
		Up Yellow Dog Creek. Inspect trail crew and return.			7		2		2		
		Yellow Dog Creek to Keeler Creek sale. Inspect.			8		4		2		
		Keeler Creek sale to Big Creek via horse, and Prichard via Speeder.							1		
		Jobs picked up en route:									
		Show ranger regarding fire cooperation.					2				
		Inspect camp ground and improvements.					1				
		Inspect guard at Prichard.					2				
		Inspect small fires with extra travel (4 of them).					2	1			
		Inspect new improvement construction.					4				
		Determine location of new improvements.					2				
		Review ranger plan compliance.					2				
		Headquarters inspection.					2				
		Inspect Eagle Creek sale.					4		1		
		Total,			61	5	2	4	1	9	3

Form 578w

SAMPLE—RANGER DISTRICT TRIP PLAN

Ranger District—General Inspection—Little River District

Coeur d'Alene forest.
Plan made —— by ——.

Month ——.

Assigned to—	Trip dates	Trip and job description	Horse-travel miles	Time: Nonfield Days	Nonfield Hours	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
		Trip No. 1:									
		Coeur d'Alene to Honeysuckle R. S.							2		
		From Honeysuckle R. S., via horse to L. O. Ridge—(Inspect.)	8				2		3		
		Catch Road crew en route. (Inspect.)					4				
		From L. O. Ridge to Walker Creek Point. Inspect lookout.	7				2		2		
		From Walker Creek Point to Jackknife Peak. Inspect lookout.	9				2		3		
		From Jackknife Creek to Solitaire Creek fireman. Inspect.	8				2		2		
		Solitaire Creek to Trail crew on Tom Lavin Creek and return.	3				2		1		
		Solitaire Creek to Horseheaven R. S. Inspect fireman.	4				2		1		
		Horseheaven to Trail crew and return.	3				2		1		
		Horseheaven to Cathcart fireman. Inspect.	3				2		1		
		Return to Honeysuckle.	6						2		
		Jobs picked up en route:									
		Phenological Plot.					1				
		Range inspection south of Chilco.					1				
		Inspect special uses.									
		Camp ground inspection and improvements.					1				
		Class A and B dead fires—2 of them.					1		4		
		Inspect guard at Honeycuckle.					2				
		Inspection new improvement construction.					4				
		Determine location new improvement construction.					2				
		Review ranger's plan compliance.					2				
		Headquarters inspection.					2				
		Cooperative brush.					2				
		Inspect road maintenance of Wolf Lodge-Honeysuckle Rd.									
		Return to headquarters.							2		
		Total,				4	6	3		7	6

Form 577

SAMPLE—JOB SHEET

Figures in parentheses ( ) are: Clerical work done by supervisor and staff or duplication of work between supervisor and staff, or questionable supervisory-caliber work
7 hours=1 nonfield day. 8 hours=1 field day.

Sheet 1
National forest, Coeur d'Alene.
Administrative unit, supervisor.
Date plan was made, October 1, 1930, by whom, Group R. F. etc.

The items below the lines ruled in black are nonrecurrent or development jobs.

JANUARY

Trip No.	Job	Time: Nonfield Days	Nonfield Hours	Field: Job Days	Field: Job Hours	Field: Travel Days	Field: Travel Hours	Total Days	Total Hours
	S. Cost records	----	1	----	----	----	----	----	----
	Cutting budget record	1	----	----	----	----	----	----	----
	G. management plans	1	----	----	----	----	----	----	----
	Out-of-office conferences	----	2	----	----	----	----	----	----
	Special newspaper article	----	4	----	----	----	----	----	----
	Spot map	----	2	----	----	----	----	----	----
	Burned area map	----	2	----	----	----	----	----	----
	Telephone map	----	2	----	----	----	----	----	----
	(A to K) sheets	(12	0)	----	----	----	----	----	----
	Allotment estimates, with rangers	3	----	----	----	----	----	----	----
	Allotment estimates, other	9	----	----	----	----	----	----	----
	Form 44	----	1	----	----	----	----	----	----
	Statistical report	----	3	----	----	----	----	----	----
	Supervisor's conferences with F. O. S	----	10	----	----	----	----	----	----
	Supervisor's and staff's conferences with others	3	----	----	----	----	----	----	----
	Staff conferences with F. O. S	----	(10)	----	----	----	----	----	----
	Telephone calls	----	5	----	----	----	----	----	----
	Miscellaneous field jobs. (See Appendix.)	----	----	----	9	----	6	----	----

FEBRUARY

Trip No.	Job	Time: Nonfield Days	Nonfield Hours	Field: Job Days	Field: Job Hours	Field: Travel Days	Field: Travel Hours	Total Days	Total Hours
	Out-of-office conferences	----	2	----	----	----	----	----	----
	Movie campaign	----	----	2	----	----	----	----	----
	Visibility maps	1	3	----	----	----	----	----	----
	Revision of improvement plans	1	----	----	----	----	----	----	----
	Revision of telephone plans	----	2	----	----	----	----	----	----
	Revision of trail plans	----	6	----	----	----	----	----	----
	Budget conference with R. O	----	----	1	----	----	4	----	----
	Revise analyses	15	----	----	----	----	----	----	----
	Revise analyses (check diaries)	6	----	----	----	----	----	----	----
	Supervisor's conferences with F. O. S	----	10	----	----	----	----	----	----
	Supervisor's and staff's conferences with others	3	----	----	----	----	----	----	----
	Staff conferences with F. O. S	----	(10)	----	----	----	----	----	----
	Telephone calls	----	5	----	----	----	----	----	----
	Miscellaneous field jobs. (See Appendicx.)	----	----	----	8	----	5	----	----
	Miscellaneous nonfield jobs. (See Appendix.)	5	4	----	----	----	----	----	----

Miscellaneous nonfield jobs. (See Appendix.)	5	4						
Trouble shooting				4		4		
M. P. O. equipment, Form 26 and miscellaneous office mail	3	5						
Total recurrent	44	2	1	5	1	2	47	1
Timber survey								
Clerical job analysis							10	
Total nonrecurrent or development							10	
Grand total	44	2	1	5	1	2	57	1

Trouble shooting				4		4		
M. P. O. equipment, Form 26 and miscellaneous mail	3	5						
Total recurrent	40	5	4	4	1	5	46	6
Timber survey								
Total nonrecurrent or development								
Grand total	40	5	4	4	1	5	46	6

SAMPLE—JOB SHEET—Continued

Trip No.	MARCH Job	Time: Non-field Days	Non-field Hours	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
	Cut-over area inventory		4	7		1			
	G. applications	1							
	G. trespass				5		3		
	Out-of-office conferences		2						
	Guard instructions—review		2						
	Certification fire cooperative assessments		5						
	Prepare M. R. 2's or approve	1	2						
	Personnel ratings by supervisor	4							
	Personnel ratings by staff men	(3)							
	Ranger meeting	2							
	Hiring		3						
	Supervisor's conferences with F. O. S		10						
	Supervisor's and staff's conferences with others	3							
	Staff conferences with F. O. S		(10)						
	Telephone calls		5						
	Miscellaneous field jobs. (See Appendix.)				9		6		
	Miscellaneous nonfield jobs. (See Appendix.)	5	4						
	Appraisal—large sales			(5)		(1)			
	Check cruise—large sales appraisal			(1)			(5)		

Trip No.	APRIL Job	Time: Non-field Days	Non-field Hours	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
	Cut-over area inventory		4	7		1			
	Conference regarding insect control		4						
	Insect control			4		2			
	Approve G. applications	1	3						
	G. trespass				5		3		
	Out of-office conferences		2						
	Land exchange examinations and reports	1	5	3	4	1			
	N. P. ownership list for fire cooperative (percentages)		4						
	Suballotments to rangers	1	4						
	Form 44		1						
	Hiring		4						
	Supervisor's conferences with F. O. S		10						
	Supervisor's and staff's conferences with others		(10)						
	Staff conferences with F. O. S								
	Telephone calls		5						
	Miscellaneous field jobs. (See Appendix.)				9		6		
	Miscellaneous nonfield jobs. (See Appendix.)	5	4						
	Appraisal—large sales	(3)		(3)			(4)		
	Check cruise—large sales appraisal			(1)			(6)		

Trouble shooting				4		4		
M. P. O. equipment, Form 26 and miscellaneous mail	3	5						
Total recurrent	29	3	15	2	4	2	48	7
Timber survey								
Total nonrecurrent or development								
Grand total	29	3	15	2	4	2	48	7

Trouble shooting				4		4		
M. P. O. equipment, Miscellaneous mail	3	5						
Total recurrent	26	2	20	6	6	7	53	7
Staff training camp			14		2		16	
Total nonrecurrent or development			14		2		16	
Grand total	26	2	34	6	8	7	69	7

123550—32——12

SAMPLE—JOB SHEET—Continued

Sheet 2.

National forest, Coeur d'Alene.
Administrative unit, supervisor.
Date plan was made October 1, 1930, by whom, Group R. F. and S. O.

Figures in parentheses ( ) are: Clerical work done by supervisor and staff or duplication of work between supervisor and staff, or questionable supervisory-caliber work. 7 hours=1 nonfield day. 8 hours=1 field day.

The items below the lines ruled in black are nonrecurrent or development jobs.

Trip No.	MAY — Job	Time: Non-field Days	Non-field Hours	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
	820 reports		1						
	Examination cut-over areas			5		2			
	Insect-control inspection			3		2			
	Planting			1			1	4	
	Out-of-office conferences		2						
	Examine S. U. applications				3				
	S. U. applications and reports		1						
	Land exchange examinations and reports	1	6	3	4	1			
	Fire organization map		2						
	Fire organization charts		1						
	Project sale fire plans—review		1						
	Review guard instructions		1						
	Fire cooperation collections		1						
	Preparing for guard training camps	1	4	1					
	Start experienced road crew			1	4		4		
	Start new road crew			1	4		4		
	Inspect new road crew				4		2		
	Review road costs		2						
	Clerical rating		3						
	Hiring		3						
	Camp ground planning			2	2		4		
	Visiting officers	5							
	Supervisor's conferences with F. O	1	3						

Trip No.	JUNE — Job	Time: Non-field Days	Non-field Hours	Field: Job Days	Job Hours	Travel Days	Travel Hours	Total Days	Total Hours
	820 reports		1						
	F. & G. trespass		2						
	Out-of-office conferences		1						
	S. U. applications and reports		1						
	Guard training camps			18		3			
	Fire foreman camp			3					
	Fire suppression			3					
	Check 929's		2						
	Inspect experienced road crew once				4		2		
	Inspect new road crew twice			1		1			
	Inspect new road crew once			G.I.					
	Review road costs		2						
	Form 44, etc		4						
	Hiring		4						
	Visiting officers	5							
	Supervisor's conferences with F. O	1	3						
	Supervisor's and staff's conferences with others	3							
	Staff conferences with F. O		(10)						
	Telephone calls		5						
	General inspection. (See Appendix.)			7		5	6		
	Miscellaneous field jobs. (See Appendix.)				5		3		
	Miscellaneous nonfield jobs. (See Appendix.)	1	4						
	S.—Inspection etc. (See Appendix.)								

Supervisor's and staff's conferences with others	3							
Staff conferences with others		(10)						
Telephone calls		5						
Miscellaneous field jobs. (See Appendix.)			1	1		6		
Miscellaneous nonfield jobs. (See Appendix.)	5	4						
S.—Inspection, etc. (See Appendix.)								
Copper Creek sale			2		1	6		
Burnt Cabin sale			2					
Picnic sale			1	4				
Eagle sale								
Keeler sale								
Colburn sale								
Trouble shooting				4		4		
M. P. O. equipment								
Miscellaneous mail	3	5						
Total recurrent	26	6	26	6	11	2	64	6
Camp ground—general recreation plan	1		6				7	
Total nonrecurrent or development	1		6				7	
Grand total	27	6	32	6	11	2	71	6

Copper creek sale								
Burnt cabin sale				2		4		
Picnic sale								
Eagle sale			2	4	1	3		
Keeler sale			1					
Colburn sale			1			4		
Trouble shooting				4		4		
M. P. O. equipment								
Miscellaneous mail	2	4						
Total recurrent	18	1	38	3	13	2	69	6
Total nonrecurrent or development								
Grand total	18	1	38	3	13	2	69	6

SAMPLE—JOB SHEET—Continued

JULY

Trip No.	Job	Time							
		Non-field		Field				Total	
				Job		Travel			
		Days	Hours	Days	Hours	Days	Hours	Days	Hours
	820 reports		1						
	F. & G. trespass		2						
	Out-of-office conferences		1						
	S. U. applications and reports		1						
	Preparation closures (to camp fire) notices		3						
	L. E. cases		2						
	Stimulating fire-control work		3						
	Fire dispatching	2							
	Emergency guards	1							
	Fire suppression			12					
	Check 929's		4						
	Inspect experienced road crews once				4		4		
	Inspect new road crew twice			1	4	1			
	Inspect new road crew once			G.I.					
	Review road costs		2						
	Hiring		3						
	Visiting officers	5							
	Supervisor's conferences with F. O	(1	2)						
	Supervisor's and staff's conferences with others	3							
	Staff conferences with F. O	1	2						
	Telephone calls		5						
	General inspection. (See Appendix.)			11		9			
	Miscellaneous field jobs. (See Appendix.)								
	Miscellaneous nonfield jobs. (See Appendix.)	1	4						
	S.—Inspection, etc. (See Appendix.)								
	Copper Creek sale			3		1	6		
	Burnt Cabin sale			3					
	Picnic sale			1	4				
	Eagle sale				2	1	1		
	Keeler sale								

AUGUST

Trip No.	Job	Time							
		Non-field		Field				Total	
				Job		Travel			
		Days	Hours	Days	Hours	Days	Hours	Days	Hours
	820 reports		1						
	Seed crop report		1						
	F. & G. trespass		2						
	Out-of-office conferences		1						
	Special use applications and reports		1						
	L. E. cases		3						
	Stimulating fire-control work		3						
	Fire dispatching	2							
	Emergency guards	1							
	Fire suppression			12					
	Check 929's		6						
	Inspect experienced road crew once				4		2		
	Inspect new road crew once				4		4		
	Review road costs		2						
	Form 44		1						
	Hiring		4						
	Visiting officers	5							
	Supervisor's and staff's conferences with others	3							
	Supervisor's conferences with F. O		10						
	Staff conferences with F. O		(10)						
	Telephone calls		5						
	Miscellaneous field jobs. (See Appendix.)								
	Miscellaneous nonfield jobs. (See Appendix.)	1	4						
	General inspection. (See Appendix.)			11		9			
	S.—Inspection, etc. (See Appendix.)								
	Copper Creek sale				2	1	6		
	Burnt Cabin sale				2				
	Picnic sale				2				
	Eagle sale			G.I.					
	Keeler sale			G.I.					

Colburn sale								
Trouble shooting				4		4		
M. P. O. equipment								
Miscellaneous mail	2	4						
Total recurrent	21	4	33	2	13	7	68	5
Inspection training trip with supervisor			3		1		4	
Total nonrecurrent or development			3		1		4	
Grand total	21	4	36	2	14	7	72	5

Colburn sale			G.I.					
Trouble shooting				4		4		
M. P. O. equipment								
Miscellaneous mail	2	4						
Total recurrent	22	2	25	2	12		59	4
Total nonrecurrent or development								
Grand total	22	2	25	2	12		59	4

SAMPLE—JOB SHEET—Continued

SEPTEMBER

Trip No.	Job	Time							
		Non-field		Field				Total	
				Job		Travel			
		Days	Hours	Days	Hours	Days	Hours	Days	Hours
	820 reports		1						
	F. & G. trespass		2						
	Out-of-office conferences		1						
	S. U. applications and reports		1						
	Final certification fire-cooperative assessments		2						
	Fire suppression			3	4				
	Check 929's		4						
	Inspect experienced road crew once				4		4		
	Inspect new road crew once				4		4		
	Review road costs		2						
	Hiring		3						
	Visiting officers	5							
	Supervisor's and staff's conference with others	3							
	Supervisor's conferences with F. O		10						
	Staff conferences with F. O		(10)						
	Telephone calls		5						
	Miscellaneous field jobs. (See Appendix.)				4		3		
	Miscellaneous nonfield jobs. (See Appendix.)	1	4						
	General inspection. (See Appendix.)			1			7		
	S.—Inspection, etc. (See Appendix.)								
	Copper Creek sale			1	4	1	6		
	Burnt Cabin sale			1	4				
	Picnic sale				4				
	Eagle sale								
	Keeler sale								
	Colburn sale								

OCTOBER

Trip No.	Job	Time							
		Non-field		Field				Total	
				Job		Travel			
		Days	Hours	Days	Hours	Days	Hours	Days	Hours
	820 reports		1						
	Cooperative slash burning:								
	Atlas Tie—Lakes				2		2		
	Higbee—Lakes				2		2		
	Bogle—Lakes				2		2		
	Blank—Lakes				2		2		
	Boro—Grizzly				2		2		
	Planting			3	4	1	4		
	Out-of-office conferences		2						
	Show-me trip			1			4		
	Special use applications and reports		1						
	Land exchange examinations and reports	1	5	3	4	1	4		
	Slash complaint trips				4		4		
	Road location			10		1			
	Inspect experienced road crew once				4		2		
	Inspect new road crew once				4		4		
	Review road costs		2						
	Form 44		1						
	O. S. examination		1						
	Hiring		4						
	Visiting officers	5							
	Supervisor's and staff's conferences with others	3							
	Supervisor's conferences with F. O	1	3						
	Staff conferences with F. O	(1	3)						
	Telephone calls		5						
	Miscellaneous field jobs. (See Appendix.)			1	1		6		
	Miscellaneous nonfield jobs. (See Appendix.)	5	4						
	S.—Inspection, etc. (See Appendix.)								
	Copper Creek sale			1	2	1	6		
	Burnt Cabin sale			1	4				
	Picnic sale			1	2				

Trouble shooting			4		4			
M. P. O. equipment								
Miscellaneous mail	2	4						
Total recurrent	18		10		4	4	32	4
Total nonrecurrent or development								
Grand total	18		10		4	4	32	4

Eagle sale			1	4	1	3		
Keeler sale			1					
Colburn sale			1			4		
Trouble shooting				4		4		
M. P. O. equipment								
Miscellaneous mail	3	5						
Total recurrent	24	2	29	7	11	7	66	
Interforest travel			4		2		6	
Total nonrecurrent or development			4		2		6	
Grand total	24	2	33	7	13	7	72	

SAMPLE—JOB SHEET—Continued

NOVEMBER

Trip No.	Job	Time							
		Non-field		Field				Total	
				Job		Travel			
		Days	Hours	Days	Hours	Days	Hours	Days	Hours
	820 reports		1						
	Examination cut-over areas			5		2			
	G. report	1							
	Out-of-office conferences		2						
	399 reports		2						
	Land exchange examinations and reports	1	6	3	4	1	4		
	Special N. P. report on fire cooperative fire fighting costs		4						
	Slash complaint trips				4		4		
	Form 926 report	1							
	Map B	1							
	R. & T. signs		2						
	Review road cost		2						
	Clerical ratings		3						
	Supervisor's conferences with F. O. S		10						
	Supervisor's and staff's conferences with others	3							
	Staff conferences with F. O. S		(10)						
	Telephone calls		5						
	Miscellaneous field jobs. (See Appendix.)				9		6		
	Miscellaneous nonfield jobs. (See Appendix.)	5	4						
	Appraisal—large sales	(3)		(4)			(4)		
	Check cruise—large sales appraisal			(1)			(5)		
	S.—Inspection, e c. (See Appendix.)								
	Copper sale			1	4				
	Burnt Cabin sale			1	4	1	6		
	Picnic sale				4				
	Eagle sale								
	Keeler sale								
	Colburn sale								

DECEMBER

Trip No.	Job	Time							
		Non-field		Field				Total	
				Job		Travel			
		Days	Hours	Days	Hours	Days	Hours	Days	Hours
	820 reports		1						
	Out-of-office conferences		2						
	Revise land exchange plan		4						
	Water power report		2						
	Revision fire-control plans	9							
	428 data	1							
	Revision trail map—annually		(3)						
	Check trail traverse data		2						
	Road costs—report and review	1							
	R. & T. expenditure—report and review		1						
	Inspect clerk	2							
	Supervisor's conferences with F. O. S		10						
	Supervisor's and staff's conferences with others	3							
	Staff conferences with F. O. S		(10)						
	Telephone calls		5						
	Miscellaneous field jobs. (See Appendix.)				8		5		
	Miscellaneous nonfield jobs. (See Appendix.)	5	4						

Trouble shooting				4		4			Trouble shooting				4		4		
M. P. O. equipment									M. P. O. equipment								
Miscellaneous mail	3	5							Miscellaneous mail	3	5						
Total recurrent	26	4	19	1	8	1	53	6	Total recurrent	31		1	4	1	1	33	5
Timber survey									Timber survey								
									Analyze sales work	12						12	
Total nonrecurrent or development									Total nonrecurrent or development	12						12	
Grand total	26	4	19	1	8	1	53	6	Grand total	43		1	4	1	1	45	5

APPENDIX TO JOB-LOAD ANALYSIS

Miscellaneous Yearling Field Jobs Out of Fire Season [1]

(To prorate to months)

	Job	Travel
	Days and hours	*Days and hours*
Check cruise large sale appraisal	(3.0)	(2.0)
Cruising 1 large sale appraisal	1.4	2.0
Cruising 4 small sales	3.0	2.0
Appraise 1 large sale	(12.0)	(2.0)
With bidders over chance	1.0	1.0
Timber settlement	.2	x
Contacts with attorneys, etc. (p. PR–1)	.5	x
Prepared talks	.4	1.4
Fire cooperation logging companies	1.0	x
Train new ranger	2.0	
	9)8.15	6.4
Per month (net)	.9	.6
Duplication by staff	(15.0)	(4.0)

[1] Prorated against 9 months.

Miscellaneous Yearling Nonfield Jobs

(To prorate to months)

	Out of fire season [1]	Yearlong
	Days and hours	*Days and hours*
Project sale negotiations	4.0	
Appraisal 1 large sale	(6.0)	
Advertisement and sample agreements	4.0	
Logging cost data	1.0	
Prepare administrative sales instructions	1.3	
Appraisals 3 small sales	1.4	
Cut and sold reports		0.1
Timber settlement	.1	
Timber trespass	.2	
Game organizations	1.0	
Contacts with attorneys, etc. (p. PR–1)	.3	
Service club meetings	1.5	
Prepared talks	3.2	
Newspaper items		0.6
Bulletin articles		0.6
Mining claim reports	.3	
Classification appeals	.1	
Land exchange negotiations		3.6
Review and approval rangers land exchange reports	1.3	
Assisting proponants land exchange	4.0	
Water-power permits	.2	
Repairs to machinery		1.0
Vouchers		1.5
Warehouse inspection		1.5
Review ranger work plan reports		1.5
Monthly work plans, supervisors		1.4
Monthly work plans, staff		(1.4)
Special report	6.0	
Quarterly requisitions	.2	
Compensation cases		2.4
Equipment requisitions	1.0	
Supplies		1.0
Total	8)32.3	12)17.0
Per month except 6/1–9/30	4	
Per month all months	5.4	
Fire season 6/1–9/30		1.4
Duplication by staff	(6.0)	April and November

[1] Prorated against 8 months.

APPENDIX TO JOB-LOAD ANALYSIS

Study of correspondence—7/1/29–6/30/30 supervisor's office Coeur d'Alene National Forest

(Number of ¼ pages, single spaced)

Received		Designation	Written							
			Supervisor		Assistant supervisor		Executive assistant		Other clerks	
6/1–9/30 summer	10/1–5/31 winter		S	W	S	W	S	W	S	W
69	103	FA	3	9	------	------	37	28	65	80
365	994	O	109	154	104	255	14	34	11	62
117	144	PR	14	17	------	8	------	------	1	1
141	399	S–RS, RE, etc	54	102	87	174	------	------	5	11
137	511	L	43	126	6	46	------	------	2	4
137	119	G	15	99	8	86	------	6	2	1
61	167	EM, ER, etc	10	62	5	30	------	------	10	15
14	286	Z	14	19	8	281	------	------	------	------
1,041	2,723	Total	262	588	218	880	51	68	96	174
Per month 260	341		63	74	53	110	13	9	24	22
Full pages per month 65	85		16	18	13	28	3	2	6	6
3,764		Grand total ¼ pages	850		1,098		119		270	

Total written in forest supervisor's office, 2,337 (584¼ full pages).
Received 65 full pages per month, summer } Total 941 full pages a year.
Received 85 full pages per month, winter }
Written by supervisor and assistant supervisors 29 full pages per month, summer.
Written by supervisor and assistant supervisors 46 full pages per month, winter.
Written by supervisor and assistant supervisors 487 full pages yearlong.
Count does not include the following exceptions:

1 Green slips.
2 Form 861–M.
3 Contracts covering horse, auto, and equipment hire.
4 Ranger allotment sheets.
5 Property transfers—Forms 939 and 858.
6 Report forms such as Road and Trails.
7 Individual instructions to guards, etc.
8 Vouchers.
9 Rangers' work plans and monthly reports.
10 Statistical reports.
11 Grazing and fish and game reports.
12 Grazing and special use applications and permits.
13 Bills of lading.
14 Daily, weekly, and departmental bulletins.

Conferences

Average time per day (not per caller) and average number callers per day in office

	Local forest officers (1)		Other officers (see inspectors)		Business callers (1)		Tourists, etc.		Period of record
	Number	Time	Number	Time	Number	Time	Number	Time	
		Hours		*Hours*		*Hours*		*Hours*	
McHarg [1] [2]	6½	2½	⅓	20	3⅙ 50% not special.	50	------	------	7 days in 7/1 to 7/7.
Webb [1]	1½	1.05	½	40	1½ 64% not special.	43	⅒	.03	67 days in 7/1 to 9/30.
Sanderson [1]	2	.22	------	------	1½ 13% not special—much hiring of men.	25	------	------	24 days in 7/1 to 8/31.
Drake [1]	5/6	.18	+0	+0	1½ 55% not special.	30	------	------	42 days in 7/1 to 9/30.

[1] Includes duplication between officers.
[2] Includes Clarke-McNary, etc., conferences.
"Special" is work set up under other headings in analysis viz "employment," etc.

APPENDIX TO JOB-LOAD ANALYSIS

Classification of business callers

Number of callers

	Want job	Equipment	Reporter	Exchange	Land exchange	Others	R. and T
McHarg	4	3	2	3	1	The balance.	
Per day	½	½	¼	½			
Sanderson, total	26				2	5	6
Drake, all season	33			1		27	3
Webb	17		6	6	9	71	

Pasi actual time on suppression

	1928		1929		1930	
Sanderson:						
Fire suppression—	*Days*	*Hours*	*Days*	*Hours*	*Days*	*Hours*
Field	24	284	31	368	9	44
Office		28		31		4
Drake:						
Fire suppression—						
Field	18	272	22	299	8	70
Office		27	4	25		7
Supervisor McHarg and Webb:						
Fire suppression—						
Field			11	118	6	31
Office	0		11	3		
				12		3
Average						14

Roche:
0 in July and August, 1928.
10 in September, 1928.
19 in August, 10½ September, 0 in July, 1929.

Fire suppression time class C fires

Coeur d'Alene

Year	Fire	Control time		Patrol time		Total elapsed—discovery			Time of—		Area
									Staff or supervisor on	Ranger on	
		Hours	*Minutes*	*Hours*	*Minutes*	*Days*	*Hours*	*Minutes*	*Days*	*Days*	*Acres*
1929	Terror	16	15	129		6	2	0	0	2	40
	Gold H	26	30	256		11	19	20	2	2	200
	Bear 2	122	00	391		22	1		3	2	50
	Wallace	29	45	186		9		05	0	1	18
	Montg	52	00	126		8		55	4½–4½	3	50
	Spruce	187	30	470		28	5	30	6½	[1] 6	38
	Scholtz	3	45	95		4	3	04	0	[1] 1	31
	H. H	16	30	273		12	5	30	0	6	28
	Schroeder	20	38	113		5	15		1	[1] 2½	18
	Carlin 1	11	30	180		8	1	30	1½	3½	30
	Hayden	7	30	48		5	12	2	2	1	36
	Carlin 2	68	30	53		6	2	0	2½	3–1	502
	Cedar	317	15	718		43	13	15	24–8–2–7	24–10	2,110
	Bear	104	30	263		15	22		4–1	6–6–1	550
	Flat Cr	198	00	324		21	13	30	5½	11½–1½–1½	350
	Hulliman	61	30	342		16	23	40	0	4	39
	N. Falls	118	00	168		14	2	0	0	11–7	15
	Edith	51	30	172		9	9	50	4	5	106
	Can	78	00	408		20	17	45	0	7½	75
										[2] 100	

[1] Alternate.
[2] Each 5¼ days including the 24-day fire. Each 2¾ days excluding the 24 and 11 day fires. For 1 ranger to each class C.

Total time of one staff man—60½ to 1,929 class C fires.
Exclusive 24 day fire:
By staff (if attended) average per cent 5 days.
By staff (if attended) average per cent 3¼ days.

APPENDIX TO JOB-LOAD ANALYSIS

Record of lightning fires

Year	A	B	C	Total	Year	A	B	C	Total
1921	3	7	4	14	1926	45	10	5	60
1922	17	12	4	33	1927	72	5	0	77
1923	40	6	3	49	1928	24	7	1	32
1924	27	15	1	43	1929	55	26	7	88
1925	37	17	4	58	1930	82	10	0	92

Timber sales

	Small	Medium	Large
29	3	5	1
28		3	1
27	2	3	
	5	11	2
	2	3	1

For the last 5 years 33 sales cutting under 1,000 feet yearly averaged 330 M per year in cut.

	Vouchers	Disbursed
Fiscal year:		
1928	1,672	$149,987
1929	1,705	197,188
1930	2,209	362,919
Total	5,586	710,094
Average	1,862	236,698

Includes approximately $135,000 project bug work.
Average exclusive project trips 1,689; approximately $220,000.

APPENDIX TO JOB-LOAD ANALYSIS

Supervisory staff—major sales work	May	June	July	August	September	October	November
[1] 3 Copper Creek	I-4, C-4, M-4, D-2, S-2 — 2.0		I-4, C-1.4, M-4, D-2, S-2 — 3.0	D-2 — 0.2	M-4, GI-1.0 — 1.4	C-1.0, S-.2 — 1.2	M-4, I-1.0 — 1.4
Travel time round trip	1.0		1.0	1.0	1.0	1.0	1.0
Total	3.0		4.0	1.2	2.4	2.2	2.4
[1] 3 Burnt Cabin	M-4, I-1.0, C-4 — 2.0	D-2 — 0.2	M-4, I-1.0, C-1.4 — 3.0	D-2 — 0.2	M-4, I-1.0 — 1.4	D-2, S 2, C-1.0 — 1.4	M-4 — .4, I-1.0 — 1.0
Travel time round trip additional from Copper	.4	.4	.4	.4	.4	.4	.4
Total	2.4	.6	3.4	.6	2.0	2.0	2.0
[1] 2 Picnic	I-4, M-1.0 — 1.4		I-4, C-1.0 — 1.4	D-2 — .2	I-4 — .4	S-2, C-1.0 — 1.2	I-4 — .4
Travel time round trip	.5		.5	.5	.5	.5	.5
Total	2.1		2.1	.7	1.1	1.7	1.1
[1] 2 Eagle		M-1.0, I-4, C-1.0 — 2.4	D-2 — .2	I-4 — [2] .4		I-4, C-1.0 — 1.4	
Travel time round trip, 9 hours		1.1	1.1	1.1		1.1	
Total		3.5	1.3	1.5		2.5	
[1] 1 Keeler		I-4, C-4 — 1.0		1-4 — [2] 0.4		I-4, C-4 — 1.0	
Travel time round trip		1.2		1.2		1.2	
Total		2.2		1.6		2.2	
[1] 1 Colburn		I-4, C-4 — 1.0		I-4 — .4		I-4, C-4 — 1.0	
Travel time round trip		.4		.4		.4	
Total		1.4		1.0		1.4	

[1] Number of men check scaled by.

[2] Covered in G. I.

Check scaling: Unit time 4 hours each check sale.
Marking: 4 hours per trip for 4 trips, total 2 days each of 10 MM sale. On smaller scales 2 hours each trip.
M=Marking.
S=Slash disposal inspection.
D=Sanitation inspection.
C=Check scaling.
I=Inspection of cut.
Inspection of marking, etc., where not separately set out.

I { Inspect marking: 2 hours on 12 M. 2 hours on others where sample marking not done.
Inspect cutting: 2 hours.
Inspect sanitation: 2 hours.
Inspect slash disposal: 2 hours. } All I=1.0 for large sales. } For the 4 smaller sales all I=4 hours. 1 hour each feature.

APPENDIX TO JOB-LOAD ANALYSIS

		1930	Estimated 1931	Normal cut	Total volume
Copper Creek	Ogston	5,000 M.	15,000	10,000	(35,000 M.)
Picnic Creek	Clack	0	8,000	4,000	(8,000 M.)
Burnt Cabin	Larson	14,000 M.	5,000	12,000	(95,000 M.)
Eagle Creek	Hankins	0	8,000	4,000	(250,000 M.)
Hecla Mining Co		500 M.	0	0	
A. B. Colburn	Ranger	2,000 M.	2,000	2,000	(3,700 M.)
Keeler Creek	Thompson	0	3,000	2,000	
Small sales	Ranger	1,000 M.	1,000	1,000	
		22,500 M.	42,000	35,000	
Possibility of Cascade			5,000	Ohio match finish Burnt Cabin middle of season and move to Cascade.	
			47,000		

Number of sales made calendar year, 1929.
25 sales of $500 or less.
3 sales of $501 to $1,000.
5 sales of $1,001 to $5,000.
1 sale over $5,000.
Cut May 1 to Nov. 30.

Cooperative work: F. S. F. Y. 1930

Activity	Disbursed	Receipts		
		Expended 1930	Forwarded	Total
Brush disposal and sanitation	$21,535.26	$21,535.26	$13.868.78	$35,404.04
Cooperation-fire prevention	4,327.25	4,327.25	(−2,175.20)	2,152.05
Administrative scaling	3,743.56	3,743.56	349.54	4,093.10
C: Roads	969.55	969.55	180.45	1,150.00
M: Roads	1,037.76	1,037.76	(−45.13)	992.63
Total	31.613.38	31,613.38	12,178.44	43,791.82

Brought forward tr. 1929	$43,791.82 8,155.24	35,636.58 total receipts 1930. 50,000.00 paid direct by coop. 1929. 38,000.00 paid direct by coop. 1930.

APPENDIX TO JOB-LOAD ANALYSIS

WORK SHEET FOR GENERAL INSPECTIONS

Jobs	Lakes			Little River			Forks			Coeur d'Alenes			Grizzly Mtn.			Shoshone			Total		
	O	J	T	O	J	T	O	J	T	O	J	T	O	J	T	O	J	T	O	J	T
2 phenological observations 2 hours		1			1															2	
Range inspections		4						9												14	
Show 3 Rangers re fire coop. 6 hrs		2									2						2			6	
Inspect S. U.'s 3 hrs		1									1			1						3	
Camp ground inspection 4 hrs		1			1			1			1			2			1			5	
Camp ground inspection imp. 3 hrs		1						1												4	
50% guard inspection 33 at 2 hrs		10	13		14	18		10	20		8	17		10	17		14	18		66	103
F. F. inspection 25 at 30 min. job		4			1			2			2			2			2			13	
F. F. inspection 25 at 2 hrs. travel			16			4			8			8			6			8			50
Inspect new improvement const. 3.0		4	2		4			4			6			4			4			26	2
Determine location imp. const. 1.4		2			2			2	1		2	1		2	1		2			12	3
Inspect 9 trail crews at 2 hours		2			4	2		2	8		2	7		4	10		4	3		18	30
Review ranger plan compliance 1.4		2			2			2			2			2			2			12	
Headquarters inspection at 2 hours					2			4			2			4			2			14	
(See appendix for unit S. inspection figures.)																					
Colburn sales insp. Lakes district		4	1																	4	1
Keeler sales insp. Shoshone																	4	2		4	2
Eagle sales insp. Shoshone																	4	1		4	1
Small sales insp. 6 hours total		2			0			0			2			1			1	1		6	1
Atlas Tie Brush Pile Lakes District		2																		2	
Higbee Tie Brush Pile Lakes District		2	1																	2	1
Boro Tie Brush Pile Grizzly, district														2						2	
Bogle Tie Brush Pile Lakes district		2	1																	2	1
Blank Tie Brush Pile Lakes district		2	1																	2	1
S. U. Brush-pile L. or F					2						2									4	
Montgomery Cr. brush-pile, C. d'Alene																					
Inspection road construction:																					
Current 4-hour job					4															4	
Little River district																					
Grizzly														4						4	
Inspection road maintenance								1												1	
Inspection road construction (N. R.)		2	1					2												4	1
Total days		6	4		4	3		5	4		4	4		4	4		5	4		30	24
Total hours		2	4		6	0		0	5		0	1		6	2		2	1		0	5

ANALYSIS AND PLAN—SUPERVISOR'S WORK—SIERRA NATIONAL FOREST, REGION 5, 1929

Area, 1,662,560 a. gross.
Annual gross receipts, $325,000.
Annual gross expenditures, $115,000 plus cooperative funds.
Annual cut, 80,000,000 ft.
95 fires per year—24 per cent class C.
Area burned, 16,500 acres—average per year last five years.
23 fireguards.
412 summer homes.
17 resorts.
13,000 cattle and horses.
35,000 sheep and goats.
150 permittees.
$52,000 road and trial allotment.
Adjacent population, 200,000.

(This study is shown here only in part. See the foregoing analysis and plan for the Coeur d'Alene National Forest for the complete procedure.)

CONCLUSIONS—SIERRA ANALYSIS

The education, experience, and personal qualities needed to handle the position of forest supervisor on this forest, as it is aimed that it shall be handled, are shown on the accompanying sheets.

Part 2 for the peak season shows the weight of the load in number of days of work, as follows:

	June	July	August	September
Supervisor	34.7	31.7	32.7	28.1
Forest examiner	15.5	10.5	15.5	23.5
Average	25.2	21.2	24.2	25.7
Fire chief	23.0	10.6	18.3	20.2
Improvement project man	31.5	16.0	17.1	17.0

A total indicated job load for three and a half men in the supervisor's office.

This shows that with a distribution of the supervisory work between the supervisor and the forest examiner, the "average" gives a well balanced total time for each of the peak months for these officers.

The load of strictly supervisory-caliber work carried by the fire chief and the improvement project man is somewhat light; enough surplus time being available to consider:

(1) Delegating enough of their work to the rangers so that one man can handle both positions.

(2) Devoting more time to "development" work.

(3) Lightening the rangers load to a greater extent by having these staff men do more subsupervisory-caliber work, which this analysis does not and should not include.

Job—function	Job requirements		
	Education	Experience	Personal qualities
P. R. California Development Association, county boards, chamber of commerce, luncheon clubs, etc.	1. Technical forestry viewpoint. 2. Land economics. Silviculture. 3. Engineering, fundamental principles. 4. Public speaking. College English. 5. Range management. 6. Game management.	District ranger (preferably well rounded district). Sales administration. (Ranger district. Sales, grazing, recreation, fire. All major activities).	Sincerity. Enthusiasm for job. Definite purpose. Likeable. Meets people well. Sense of humor. Orderly mental process. Tact. Political instinct.
Fire control	7. Training in analytical methods. 8. Principles and methods of fire control. 9. Organization. 10. Equipment. 11. Technic of training. 12. Record analysis and interpretation. 13. Meteorology. 14. Training in observation (inspection). 15. Training in job analysis, writing job specifications and check lists for inspection and observation from instructions, standards and objectives.	District ranger on fire district. Fire chief or assistant supervisor. Training in inspection. Use of check list in inspection. Job analysis.	Coolness in emergency. Persistency. Aggressiveness. Decisiveness. Judgment. Leadership. Stamina. Resourcefulness.
Improvement	16. Familiarity with sources of information and enough training to use them.	District ranger including actual participation as laborer.	Practical turn of mind. Resourcefulness. Persistence. Financial acumen. Judgment.
Personnel control.	17. Personnel administration (1, 12, 14, 15). Knowledge of recognized methods, devices, and records. Methods in training.	District ranger. Member supervisor's staff. Use of methods, devices, and records.	Interest in human nature. Ideals in human relations. Impersonal judgment. Patience. Sympathy. Enthusiasm. Decision. Firmness. Frankness. Instinctive passion for facts. Ability. Willingness and urge to obtain and analyze facts and courage to act on them. Vision-strong imagination but controlled. (In digging out and interpreting facts as a basis for executive decision and action, the research point of view and research methods are indispensable but are far more difficult to apply than in the field of physical science.)
Forest management.	Forestry, including 4 years undergraduate or 2 years graduate. Plant physiology. Ecology. Lumbering. Engineering. Personnel management. Elementary zoology. Soils. Technique of fire control on cuttings.	District ranger with sales business. Work on project sales. Desirable to have work on management plan preparation and appraisal. Sales fire control. Participation in studies work.	
Lands. Recreation.	Cultural courses which will take account of the artistic values in mountain land and some training in the detailed development of recreational areas. General (elementary-freshman) geology. Lands economics (refer P. R.)	District ranger on district with considerable lands business.	

Grazing. Range control.	General botany or elementary botany. Elementary ecology. Range management bulletins. No adequate text book on range management available. Fundamentals of animal husbandry, including breeding, feeding. Methods of handling stock on the range. Silviculture. Correlation of range and timber use. Methods in extension work. (Getting things done through people.) Economics as related to range stock industry. Wild-life courses. A study of wild-life administration rather than too much emphasis on natural history and technical zoology. Game management (refer to P. R.)	District ranger on grazing district. Participation in studies work.	
Miscellaneous office jobs.	Executive management including accounting for executives (interpretation and direction of accounting work) and office management, cost, personnel management, job analyses (job specifications), scheduling and planning. Theory and practice of inspection and supervision. (Technical information as above.)	District ranger, Supervisor's Staff man with administrative experience. Participation in studies work. Details to regional office. Work on more than one forest desirable. Participation in training for the job desirable. General inspection work.	

Form 576w

SAMPLE—NATIONAL FOREST PLAN—PART 1

Sierra forest.

June 4, 1929, by Benedict, S. B. S., P. P. P., R. H., P. K., M. L M., E. W. L.

Fire Protection

Objective: Hold average annual burned area in a 5-year period to 0.2 per cent in timber types and 2 per cent in foothill types (1,940 and 5,118 acres, respectively, or 7,058 acres for forest). Reduce percentage of class C fires in timber types to 10 per cent. Confine foothill fires to foothill types. Reduce number of M. C. fires from 60 to 55 average annually. Hold costs to not to exceed $ average per year.

Major activities and their elements	Perfection and intensity of Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Assigned to—											
Fire atlas. F. C.	Hour control map. Revised as necessary.	1	Jan.		3						3
Fire atlas. F. C.	Fire business map. Annual.	1	Jan.		4						4
Fire atlas. F. C.	Camp-fire map.	1	Jan.		1						1
Fire atlas. F. C.	Lightning fire map. Annual revision.	1	Jan.		1						1
Fire atlas. E. A. and F. C.	Sheets A–K.	1	Jan.	3						3	
Fire atlas. F. C.	Visibility map. Rarely.				x					x	
	* * * * *										
Fire atlas. F. C.	Written fire plan.				x					x	
Fire atlas. F. C. and E. A.	Instructions to guards and lookouts and trail maintenance crews. Confer and review.	29	Apr.	3	4					3	4
Fire atlas. F. C.	Organization charts. Prepared by ranger—reviewed by supervisor.	4	Apr.		4						4
Fire atlas. F. C.	Burned area map.	1	Jan.		3						3
	* * * * *										
Study of year's performance. D. R., F. S.	Analysis of causes, locations, history of individual fires, functioning of organization, plans for reducing fires.										
Study of year's performance. F. C., I. R.	Preparation—F. C. 3 days; F. S. 1 day.		Nov.	4						4	
	* * * * *										
	PRESUPPRESSION										
Hiring guards. F. C.	Done by D. R. except that F. S. or F. C. will fill jobs for which D. R. can not obtain qualified men.	2	Feb.		2						2
			Mar.		4						4
	Prevention guard is hired and handled by F. S. or F. C. (See training below.)	1	Apr.		4		4			1	
			May.		4		6			1	2
			June.		2		4				6

Guard training.	F. C. F. S.	Handled in central camp. F. S. and F. C. with help from D. R. will prepare for and conduct camp.	1	June.	3		2 2				5 2			
		* * * * *												
Prevention guard.	F. C.	Prevention guard trained and supervised and schedules arranged by F. S. or F. C. Guard makes hazard inspection and hazard reduction program as well as public contact work.	1	May.			1				1			
Inspection, regular guards.	F. C.	Supervisor or F. C. will inspect each R. S. guard, improvement crew, sale area, and sawmill once during season in company with D. R. Travel time here includes talk time en route with settlers, etc.	23 gds. 16 gd. sta.	June. June. June.			2	3			2 3	3 4		
		(See additional to be done by supervisor during his general inspection.)	2 proj. sales. 2 crews. 3 mills.	June. June. June.			3	1 4 3	3	4	3	1 4 3		
Inspection, regular guards.	F. C.	The F. C. will substitute for D. R. in making guard inspections when D. R. is unable to make them at proper time. The F. C. will usually give instructions for changes to D. R. and not to guard.												
Inspection, per diem guards.		Guards handled by D. R.												
Inspection, emergency guards.		Handled like regular guards.												
Tools.		Inspection handled at time of guard inspection.												
Dispatching.	F. S.	Initial dispatching by guards and D. R. All fires reported to executive assistant who handles subsequent dispatching F. S. and F. C. alternate with executive assistant in central dispatching. F. C. is left free to go to fires, if desirable to do so. Dispatching time for forest supervisor is allowed for under telephone calls.	Total (average) fires 95, 24 per cent C.	May to Oct.	2	4					2	4		
Dispatching.	F. C.				19						19			
Sitting tight.	F. C.	Ordinarily unnecessary excepting during periods of extreme danger. Trips will be postponed until the situation is relieved (2 days per month in fire season). This is all (x) to dispatching.	4 months.	June to Oct.	x						x			
		* * * * *												
		SUPPRESSION												
	F. S.	F. S. or F. C. will go promptly to all fires which because of critical condition or location may not be controlled by the regular force during the first night.	Total (average) 95 fires 24 per cent C.	Mar to Oct.			3 20				3 20			
		Project sale and technical men are assigned to fires for training on this work.												

SAMPLE—NATIONAL FOREST PLAN—PART 1—Continued

FIRE PROTECTION—Continued

Major activities and their elements		Perfection and intensity Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
					Nonfield		Field				Total	
							Job		Travel			
					Days	Hours	Days	Hours	Days	Hours	Days	Hours
		SUPPRESSION—continued										
Inspect. Inspect class A and B fires.	Assigned to—F. C.	In addition F. C. will inspect as many small fires as possible during or immediately after the suppression job. At least 1 fire on each district having 3 or more fires.	16	May to Oct.			3				3	
Inspect class C fires.	F. C.	F. S. or F. C. will inspect.										
		* * * * *										
		DEVELOPMENT WORK—FIRE CONTROL										
	F. C.	Snag disposal on Madera cut-over and Sweetwater fire area. D. R. and F. C. will require more than 1 year.	14,000 acres.	Jan.			25				25	
		Fire equipment research.										
		* * * * *										
		IMPROVEMENT DEVELOPMENT WORK										
		* * * * *										

See Glossary for abbreviations.

SAMPLE—NATIONAL FOREST PLAN—PART 1

FOREST MANAGEMENT

Form 576w. Sierra forest.

Objective: Plan made June, 1929, by R. H.; E. W. L.; M. L. M.; P. K.; S. B. S.; R. L. D.; and M. A. B.

Major activities and their elements	Local standards of Perfection and intensity	Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
					Nonfield		Field				Total	
							Job		Travel			
					Days	Hours	Days	Hours	Days	Hours	Days	Hours
Assigned to—												
Difficulties.	(1) Sales: (*a*) To reconcile silviculture with economics, in marking. (*b*) In getting operators to observe lines of authority in sale administration. (*c*) To secure the operators to pursue such a plan of logging as will properly handle the units being cut over. (*d*) To hold down the annual cut to the limit of the working circle. (*e*) In getting operators to assume in full their responsibility for strict observance of all of the terms of the contracts which they have signed. (2) Management plans: (*f*) In getting management plans accepted by operators. (*g*) To determine future merchantibility of species and loggability of areas as affecting the allowable sustained yield. (*h*) To reconcile silviculture with economics. (3) Planting: (*i*) To get a large-scale planting program financed, started, and carried through. (4) Blister rust control.		Annual cut 80 MM in 2 projects and 5 small sales.									

SAMPLE—NATIONAL FOREST PLAN—PART 1—Continued

FOREST MANAGEMENT—Continued

Form 576w.

Sierra forest.

Plan made June, 1929, by R. H.; E. W. L.; M. L. M.; P. K.; S. B. S.; R. L. D.; and M. A. B.

Objective:

Major activities and their elements		Local standards of Perfection and intensity / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
					Nonfield		Field				Total	
							Job		Travel			
					Days	Hours	Days	Hours	Ds	Hours	Days	Hours
Assigned to—		(5) Correlation recreational use with silviculture. Projects sales will be handled by resident officer who is responsible primarily for woods supervision. Marking and scaling are handled by specialists under the direct supervision of the forest examiner who also is responsible for the supervision of the resident officer. All in turn are under supervision of the forest supervisor.										
Cruising.		Merchantable stands are now cruised.										
Appraisals, project sales.	F. E.	Reappraisals handled largely by logging engineer from regional office with assistance from F. E.	2 every 3 years.	Fall.			6				6	
	F. E.	Assisting regional logging engineer in computation reappraisal results.	2 every 3 years.	Winter.			1				1	
	F. E. F. S.	Going over reappraisal results and contracts with purchasers.	2 every 3 years.	Contracts.			1 1				1 1	
Appraisals, small sales.	F. E.	Appraisals on small sales handled by district ranger with assistance from technical men on supervisor's staff.	1	Spring.	2		2				4	
Project sales.	F. E.	Assisting regional logging engineer with major sale boundary adjustment usually at time of reappraisal.			x						x	

Conference.	F. E.	Consideration and approval by supervisor of company's logging plans before opening of logging season with details worked out on the ground during season. This is taken up in preseason conference between forest officers and company representatives handling other matters such as fire protection, etc.		2	Feb.			1			1	
Conference.	F. S.				Feb.			1			1	
Log. plans.	F. E.	Review of logging plans made by operator.		2	Feb.	2					2	
Sales fire plans	F.C. F. E.	Revision of sales—fire plans.		2	Feb.	1					1	
Work plans.	F. E.	Preparation work plans for sales officers and analysis last year's time use.		5	Feb.	2					2	
	F. E.	Inspection: Each sale will be inspected once every 6 weeks during season by forest examiner.	10 trips.		Apr. to Nov.			14		7		21
	F. S.	In addition to contacts made in connection with other trips, forest supervisor will make general inspection trips at 3 months' intervals to each sale (2) forest supervisor.	2 sales.		Apr. to Nov.			6		3		9
		Marking: Will be done by marking crew from supervisor's office as settings are laid out during the operating season.		6	May to Oct.			6				6
	F. E.	Average amount marked per man day 250 trees or 500 M. (Actual 6/13/29 each man was "400 trees = 800 to 1,000 M.") Checking of marking practice and sample marking by supervisor's staff monthly.										
Project sales.		Scaling handled by short-term men largely under direct supervision of forest supervisor.			Apr. to Nov.	x		x		x		x
		Check scaling will be done every 3 weeks on each of 2 project sales by project sale man or forest examiner.										
		Madera Sugar Pine woods J 2/8 mill J 4/8 T 6/8 one-half by project sale man and one-half by F. E.			Apr. to Nov.			4	4	4	4	9
	F. E.	Sugar Pine woods only J 2/8 T 2/8.						1	6	1	6	3
	F. E.	Sugar Pine mill, J 4/8 T 4/8.			Apr. to Nov.			3		3		6
		Total by forest examiner only.						4		6		10
		Scaler training: Average 1 new man a year who often has had no previous experience. He is trained by scaler with whom he is assigned, since men work in pairs through assignment to the woods with project man and forest examiner.		1	Apr. to May.			2				2
		Timber sale atlas control record. * * *										
		Cut-over cruise. * * *										
		Boundary survey and posting. * * *										
		Brush disposal. * * *										
		Cutting reports. * * *										
		* * * * *										

SAMPLE—NATIONAL FOREST PLAN—PART 1—Continued

Forest Management—Continued

Form 576w.

Objective:

Sierra forest.
Plan made June, 1929, by R. H.; E. W. L.; M. L. M.; P. K.; S. B. S.; R. L. D.; and M. A. B.

Major activities and their elements	Local standards of Perfection and intensity	Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
					Nonfield		Field				Total	
							Job		Travel			
					Days	Hours	Days	Hours	Days	Hours	Days	Hours
	Assigned to—											
Small sales. Saw timber and shakes.		Administered by district rangers. Inspection by supervisor's office, twice per year except shakes once. Mariposa district (2) J ⅜ each. Cut 700 M total F. S. Mariposa District J ⅜ each F. E. Pine Ridge district (2) J⅜ each. Cut 3 M M total F. S. Pine Ridge district J⅜ T⅜ each F. E. Kings River district (1) cut 100 M shakes F. S.	5 (4 saw timber, 1 shake)				See "General Inspections"					
S22 and other small sales. Administrative and free use.		Inspection incidental to other ranger district inspection by forest supervisor.	29 small sales including S22			x		x		x		x
Plans and revision.	F. S.	Review and modification annually of new and completed plans.		Mar.	3						3	
	F. E.	Review and modification annually of new and completed plans.		Mar.	3						3	
		(See development for periodic revisions.)		Mar.	3						3	
		DEVELOPMENT WORK—FOREST MANAGEMENT										
		Assisting regional office regional logging engineers on project sale, examination and appraisal—forest examiner.	1 every 5 years.		3		7				10	
		Negotiations with purchasers and field examination * * *	1 every 5 years. 1 every 5 years.			F. S. F. S.	2 2				2 2	

	Advertising, contracts, bonds, etc., prepared in regional office, reviewed by * * * F. S.			1								1
	F. E.			1								1
	Assisting regional logging engineers in computation F. E.	1 every 5 years.				10						10
	Planting of burns and cut-over areas by technical men and district rangers in charge of * * *	640 acres.	Nov. to Apr.			12 18						12 18
	Development of forest nursery at Northfork under supervision forest examiner, ½ acre, labor by Northfork fire guards.	300 M annual production.										
	Blister rust control program.											
	Selection, establishment, marking, and measurement selective logging plots, 1929. * * * F. E.	Two 10-acre plots.	June. Nov. Jan.	2 5		9 4 						11 4 5
	Getting power company to eliminate sheep from its cut-over lands. * * *											
Management plans.	1 major plan is process of preparation.	F. E.	Jan.	3								3
	Rechecking old cruises by taking sample plots —— 40's securing growth data on ——— increased borings, checking on limits of working.	F. E.	Feb.	3								3
		F. E.	Mar.	7								7
		F. E.	Sept.			10						10
		F. E.	Oct.			8						8
		F. E.	Nov.			4						4
	Assisted by other men of staff.	F. E.	Dec.	2								2
Investigations.	Complete remeasurement of selective logging plots every 5 years. Office 10 days; job 10 days. F. E. * * * * *	Two 10-acre plots.	June.	2		2						4

Form 576w.

SAMPLE—NATIONAL FOREST PLAN—PART 1

Improvement—G. E. and F. R. D.

Sierra forest.
Plan made June 6, 1929, by ———.

Objective:
Financing of programs as decided.
Decision on standards for different classes of structures.
Development of plans and specifications for different classes.
Development of balanced programs.
Decision on relative intensity of program—costs balanced against probable results.
Tie in of construction crews to fire control organization.
Determining required hour control.
Getting standards observed.
To construct and maintain the physical plant necessary for adequate protection, administration and utilization of the national forest at the minimum cost.

Major activities and their elements		Perfection and intensity Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
					Nonfield		Field				Total	
							Job		Travel			
					Days	Hours	Days	Hours	Days	Hours	Days	Hours
	Assign. to—											
R. & T. plans and map A.	F. S. I. R.	Reviewed annually and needed revisions made.		Jan. or Feb.	1							
		* * * * *										
	I. R.	Supervisor inspection—each crew at intervals of 3 weeks.		June to								
		* * * * *										
	F. S.	Supervisor inspects each construction project, every 6 weeks during the season while in vicinity on other work. See district inspections, etc., for additional time allowances.	6 trips.	Summer.			1	4	1	4	3	
Trails.		Maintenance handled by district rangers. Five 2-man crews. Muir trail construction handled by district rangers. 15-man crew.										
	F. S.	1 inspection trip per year by supervisor. On district inspection.	16 miles.			x	x				x	

Fire lines		Maintenance Blue canyon by district ranger—horse.	10 miles.									
	F. C.	Maintenance balance by fire chief acting as foreman.	100 miles.	Jan. to May.			37				37	
	F. C.	Maintenance and construction, fire breaks. Supervision at semimonthly intervals.	10 trips.	Jan. to May.			5		5		10	
	F. C.	Construction—25 miles new line annually by fire chief acting as foreman.		Jan. to May.			26				26	
		Construction—25 miles new line annually, inspection—1 trip.		Mar.			2		6		8	
		* * * * *										

Form 576w.

SAMPLE—NATIONAL FOREST PLAN—PART 1

Personnel—Control

Plan made Sierra forest. by ——.

Objective: Difficulties—

(1) Getting men of technical training to take and remain contented in district ranger assignments.
(2) To make and get district rangers job recognized as professional job.
(3) To get the forest schools and young technical men to realize that forestry is a job of complete land management rather than solely the technical jobs of silviculture or range management.
(4) To secure high quality fire protective force through permanence of employment of men of such force.
(5) To get men under whom trainees are assigned to properly train these men.
(6) Taking probational period seriously and uniformly.
(7) Solving fairly to individual and to Service problem of employment of men of long service whose work could be done measurably better by younger men.
(8) To set adequate promotion program and policy.
(9) Maintenance of a high plane of organization efficiency, spirit, and professional interest. (See O—Miscellaneous also.)

Major activities and their elements		Perfection and intensity / Local standards of / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
					Nonfield		Field				Total	
							Job		Travel			
					Days	Hours	Days	Hours	Days	Hours	Days	Hours
To realize	1 and 2	Induct more technical men into district ranger positions.				x		x		x		x
	2	Remove from district ranger's work such jobs as can be handled by laborers.				x		x		x		x
	3 and 8	Raise salaries for district rangers above those paid junior foresters unless such men have gone through the district-ranger grade and are assigned to positions of at least equal responsibility.				x		x		x		x
	1	Assign junior foresters as assistants to district rangers during training period.				x		x		x		x
	3	Fill selected short-term positions with forestry students. Encourage promising short-term men to take civil service examinations.				x		x		x		x
	9	Require all trainees to go through Feather River school.				x		x		x		x
	9	Set up standards to which various jobs should be done. (Analyses and plans.)				x						x
		Inspect for performance against such standards.				x		x		x		x
		(See other section—O—for jobs and time needs.)										x

5–6	Require probationer to show affirmatively his work fully justifies continuance in the service.			x		x		x		x			
9	Provide for close contact all officers of forest to promote forest pride and unity through meetings weekly in winter, joint trips, and preparation house organ.			x		x		x		x			
	Forest meetings held each week during winter months.	2 hours per week.	Jan. to Apr.	4						4			
4	Work out program of productive employment for short-term men to promote permanency of tenure of jobs in fairness to individual and to society.			x		x		x		x			
9	Check up on quality service rendered by all members of forest force annually and write letters to those whose services are unsatisfactory.		Apr.		2							2	
8	Consider and recommend deserving individuals for promotion.												
9	Official study course will be taken on official time. Reading and study to keep abreast of forestry progress and developments in allied fields will be done during the winter months, one-half hour per day.	10 lessons one-half day per month.	Jan. to Mar.	1	4					1		4	
	Use of quotas and comparisons to develop competitive spirit.	1½ days per month.	Nov. to Apr.	9						9			
9	Training.			x		x			x	x			
1 and 5 F. S.	All new district rangers will be given 2 weeks training on their districts as soon as possible; follow up of a week's time will be made within a month. J. F. or D. R. with previous experience—the first training will consist of approximately 5 days on the district to be followed within 6 weeks by a trip that will follow the route of a general inspection trip. Turnover—1 every 3 years.	1 in 3 years.	Spring.			5				5			

Form 576w

SAMPLE—NATIONAL FOREST PLAN—PART 1

Public Relations

Sierra forest.
Plan made ——— by ———.

Objective: to educate valley people from Merced to Kings River into appreciation and support of national-forest program of land management. The main difficulties to be met are—

(A) Lack of knowledge regarding timber management in relation to local community.
(B) Lack of knowledge regarding land use of all kinds as affected by national forest and national park status. Kings Canyon area particularly important.
1. Segregating recreational centers from commercial timber areas.
2. Tendency to crowd new logging operations into national forest.
3. Grazing and recreation conflict in high country.
4. Explaining full closure policy on cut-over and restocking brush areas.

(C) Lack of knowledge of fire-protection needs in foothills as watershed-protection measure and as affecting adjacent timber stands. Need for facts and program of ownership. Reconcile desire of foothill landowner to burn his property, with conflicting need of water users in valley for protection of these lands.
(D) Tendency of counties not to bear share in cost of mountain development and to divert 25 per cent fund to valleys.
(E) Development of code of outdoor good manners as regards use of fire and sanitation on part of forest users.
(F) To gain intelligent public support of legitimate financial needs of national forest.
(G) Difficulty in participating as required in valley affairs without becoming involved in time-consuming public activities which are only slightly related to forest administration.
(H) Reduction of man-caused fires.
(I) Education of forest users.
(J) Develop and maintain proper relations with State forester, park service, farm advisers, Indian Service, county boards of supervisers (3), irrigation districts (3), chambers of commerce (7), Sierra Parks Highway Associations, Lions (3), Kiwanis, (1), Rotary (3), Twenty-thirty (1), Hoo-Hoo (1), commercial (2), Elks, Masons, Boy Scouts, Y. M. C. A., State college, California Development Association, newspapers (6), sportsmens clubs (2), fish and game commission, State highway engineers, State livestock associations (2), State engineer, county health officers, Northern California and National Auto Clubs, Sierra and Alpine clubs, Regional Forest Protective Board, Federal Business Association, California Irrigation District Association, S. J. Valley Forest Association. Purpose is to direct support in favor of other objectives as listed.
(K) To focus public knowledge and opinion on treatment of privately owned timberland.

Major activities and their elements	Perfection and intensity / Local standards of / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Job to meet items in above list of objectives— A, B, C, D, E, F, G, H, I, J, K.	Membership California Development Association. Attend meetings. Average 1½ days per meeting. Misses 2 each year. Preparation for meetings 2 hours each.	20	Monthly.	2	4	7	4	7	4	17	4

A, B, C, D, E, F, I, J, K.	County boards. (Fresno, Madera, and Marisposa Counties.) 4 meetings with Fresno board, 2 with others. Each trip, 1 hour preparation, 4 hours travel, 2 hours job.	8	Y. L.	1		2		4		7		
A, B, C, D, E, F, H, I, J, K.	Luncheon clubs (12). Try to meet each club annually. Group Madera clubs in protection week (2 clubs). Preparation 1 hour, travel 4 hours, job 2 hours.	12	Y. L.	1	4	6		3		10		4
A, B, C, D, E, F, H, I, J, K.	Chamber of commerce (7). 3 meetings per year with directors, balance incidental to other trips. 1 hour average once a month. Special trips 4-hours travel, 2 hours job.	1 5				2	4	1	4	4		
	* * * * *											
All:	Special newspaper articles are prepared by— Supervisor (5). Executive assistant (20). In addition current news is given currently by supervisor and executive assistant to 2 Fresno papers. Contact with newspapers incidental to other trips.					{ 1 5 }	2			{ 1 5 }	2	
						2				2		
	* * * * *											
J.	Contact Sierra Club in field. Travel usually incidental.	1	Aug.				3					3
	* * * * *											
C.	Motion picture and lecture campaign. Supervisor, assistant supervisor, and district rangers. Meetings at Auberry, Northfork, Ahwahanee, and Mariposa. Send individual letters of invitation.	1	Mar.	1		1		1		3		

Form 576w

SAMPLE—NATIONAL FOREST PLAN—PART 1

Range Management

Objective:

Plan made —— by ——. Sierra forest.

Major activities and their elements		Perfection and intensity Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
					Nonfield		Field				Total	
							Job		Travel			
					Days	Hours	Days	Hours	Days	Hours	Days	Hours
Difficulties		(*a*) Reconciliation grazing and recreational use. (See P. R. and Lands sections.) (*b*) Meeting demand for accessible ranges from available supply. (*c*) Observance of permit requirements and of management-plan proposals by permittees. (*d*) Construction sufficient tourist pastures to safeguard feed needs of tourists and to make possible utilization of available forage resources by range stock. (*e*) To secure scientific management of fish and game. (Adequate stocking of streams, proper seasons, refuges, etc.) Notices regarding applications with blank forms sent permittees by executive assistant.	13,000 C.& H. 35,000 S.& G. 150 permits.									
		* * * * *										
To solve through— *a, b, c, d, e*		Range inspections—Cross section sufficient to determine character of ranger grazing administration will be made of 33 per cent of ranges each year. This will be done in connection with ranger district inspections. Total of 49 range allotments. (See Appendix for details of general inspection.) (Trip plans.)	15 ranges.				16	6	2	2	19	
		* * * * *										
c	F. S.	Trouble shooting—The ranger will have full authority to administer grazing in his district. Only after every effort has been exhausted by him to settle differences with stockmen, will the supervisor assist, and then such cases will be handled if possible at the time of regular district range inspection.	1 case.					3				3
a–c		Accompanying stockmen.—At time of R. D. inspections stockmen will be invited to accompany F. S. over their ranges.			x		x		x		x	
		* * * * *										
		DEVELOPMENT										
	F. S.	Revival of packers associations.		Winter.			1				1	
	F. S.	Cooperative Biological Survey—Conferences with representative of bureau and review of ranger rodent control plans.			1						1	
		* * * * *										

Form 576w

SAMPLE—NATIONAL FOREST PLAN—PART 1

Lands

Plan made —— by ——. Sierra forest.

Objective:

Major activities and their elements	Perfection and intensity Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
Difficulties	(*a*) Preparation and application of adequate plans to reconcile recreational with other land use. (See P. R. section.) (*b*) To acquire land at a reasonable price needed to round out the national forest property. (*c*) To reconcile conflicting use in areas of multiple jurisdiction. (Federal Power Commission; fish and game commission; division of water rights; State sanitary commission.) (See P. R. section.) (*d*) To secure enforcement of permit requirements. (*e*) To organize permittees into associations to function in specialized service required by special use communities such as garbage disposal, water, sanitation, etc. (*f*) To determine and see that land is put to highest use. (See P. R. section.) (*g*) To maintain integrity of jurisdiction over national forest land. (Park extensions, etc.) (See P. R. section.) (*h*) To provide adequate facilities for the traveling public at camps in the national forests. (See P. R. and Improvement sections.) (*i*) To prevent abuse of the mining laws to hold surface rights on nonmineral land.										
To solve difficulties— *a and d, f*	Uses, recreational.— Surveys and layouts made by district rangers. Applications considered only for lotted tracts. Approved by executive assistant, except for some 10 cases involving special problems approved by F. S. Permits issued by clerk, signed by exccutive assistant.	Total 412 res. 17 resorts, 22 stores. 7 pack stations, 3 wharves.	Y. L.	x 1	2	x		x		x 1	2

SAMPLE—NATIONAL FOREST PLAN—PART 1—Continued

LANDS—Continued

Sierra forest.
Plan made ——— by ———.

Objective:

Major activities and their elements	Perfection and intensity / Local standards of / Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
				Nonfield		Field				Total	
						Job		Travel			
				Days	Hours	Days	Hours	Days	Hours	Days	Hours
To solve difficulties— *a and d, f*	Inspection in field made of representative uses in each tract annually, 13 tracts.					See General Inspection.					
	Rangers inspect all uses annually.	New or Tr. 78 res.	May-Oct.	x							
	Forms 399 made on all unsatisfactory cases. Corrective action taken directly by ranger with follow up ordinarily by E. A. where action is not taken.	3 resorts, 4 stores, 5 pack stations.									
	Consideration by supervisor of flagrant cases (6).	1 wharf.			4						4
e	Associations, water, and development—Organized and supervised by district ranger with guidance by forest supervisor who recommends to regional forester they be recognized after organization.	11	Summer.		2						2
	Annual meeting attendance J ⅜ T ⅛ each.	3				1	1	1	4	2	5
a	Uses, other surveys made by district ranger.	Total in force 38 cabins, 12 drift fences, 10 corrals, 71 pastures.	Summer.		2						2
d	Applications—approved by executive assistant except for some 2 cases										
e	involving special problems which are approved by forest supervisor, 1 hour each.										
	Permits issued by clerk and signed by executive assistant.										
	Inspection of all uses annually by district rangers with Forms 399 made on all unsatisfactory cases. Remedy taken direct by district ranger with action by supervisor only in flagrant cases where district rangers can not handle.	New or Tr. 6.									
h	Public camp grounds. Inspection made in connection with recreational use or general inspections; larger camps inspected every year.	Total 38.									
	Surveys made by district rangers.	20	May-Oct.								
	* * * * *										

F. S. F. E. F. E.	Land exchange.—Reports and field work on small exchanges by forest examiner with assistance of district ranger. Approval by F. S. 4 hours (0–2.0 J–1⅛ per case for F.E.). * * * * *	2 cases. 185 acres.	May.	4		3				7
	RECREATIONAL DEVELOPMENT									
	Layout along Beasore Road will be made by Ranger Sweeley with advice from forest supervisor, 1929.		June, 1929.			2				2
	Layout and plan for recreational development along Florence Lake Road to be made by Rangers Sweeley and Poore with advice from forest supervisor and possibly help from regional office.		Oct., 1929.			3				3
	Layout and plan for recreational development of Reds Meadow country.		1930.			2				2
	* * * * *									

Form 576w

SAMPLE—NATIONAL FOREST PLAN—PART 1

Operation and Miscellaneous

Objective:

Plan made Sierra forest. by ——.

Major activities and their elements	Perfection and intensity	Local standards of Method and practice	Quantity per year	Proper months to do job in	Time in days and eighths per month or trip							
					Nonfield		Field				Total	
							Job		Travel			
					Days	Hours	Days	Hours	Days	Hours	Days	Hours
Difficulties	(*a*) To secure the balanced ranger district administration called for in the R. D. analyses and plans, i. e., to get things done. (*b*) In financial control to keep clearly in mind in all cases the relation between expenditures made and values or benefits secured.											
Assign to— R. D. Inspection F. S.	General inspection.—A general inspection will be made of each ranger district annually. The time needs for the various jobs to be done on these trips are shown under the separate job descriptions. Generally these inspections will take in total as follows: Minaret dist..... 9.4 calendar days 10.0 8-hour days. Pineridge dist..... 4 calendar days 10.4 8-hour days. Mariposa dist..... 6.4 calendar days 7.2 8-hour days. North Fork dist.. 5 calendar days 5.5 8-hour days. High Sierra dist... 12 calendar days 13.2 8-hour days. Kings River dist.. 10.4 calendar days 11.1 8-hour days. Total..... 47.4 50.6 (See Appendix for detailed time of above trips by activities.)											
	* * * * *											
a F. S.	Ranger district work plans. Revised by district ranger in conference with supervisor.		6 plans.	Jan.	6						6	
a and *b* F. S.	Revision of supervisor's plan.		1 plan.	Jan.	1						1	
a and *b* F. S.	Preparation of memos of general inspection trips.		6	Summer.	1		4				1	4
a and *b* F. E.	Preparation of memos of inspection trips.		16	Summer.	2						2	
a and *b* F. C.	Preparation of memos of inspection trips.				2						2	
a and *b* I. R.	Preparation of memos of inspection trips.		16	Summer.	2						2	

a	F. S.	Review of follow-ups by district rangers on their monthly plans 3/8 monthly.	6 months.	Mar.-Dec.	2	4					2	4
		* * * * *										
		OPERATION AND MISCELLANEOUS DEVELOPMENT										
	F. S.	First revision of district ranger plans by D. R.'s assisted by F. S.—2 days each for 4 districts, 1 day each for 2.	6	Jan.	8						8	
		First revision of F. S.'s plan.	1		3						3	
	F. S.	Once in 3 years a development trip.	1				12				12	
		* * * * *										

APPENDIX TO JOB-LOAD ANALYSIS

FOR GENERAL INSPECTION TIME ALLOWANCE

In Part 1.—Show months by districts—i. e., high country is limited to July, August, and September. Possibly some low country in part of April and November.

In Part 2.—Show each G. I. job with no time for each job. Show G. I. time with reference to appendix for details.

General inspection of ranger districts

Decimals—Eighths.

Sierra National Forest	Mina-ret	Kings River	Pine Ridge	Mari-posa	North-fork	High Sierra	Total
Muir Trail construction	2.0						2.0
Roads and trails	.1	.1	.1	.5	1.4	.7	3.3
Other improvements	.4	1.1					1.5
Firebreaks		.1		1.1	.2		1.4
Fireguards		.6	.1	1.0	1.1		3.0
Fire P. R. and miscellaneous		.1		.7			1.0
Fish and game						.3	.3
G	3.4	3.3	.2	1.3	1.2	.7	16.6
Uses		.5	1.6	.5	.2	.1	4.2
Camp grounds	.3	.5	.3		.4	.2	2.1
Lands, other	2.0				.3		2.3
Water power		.3	1.1			.1	1.5
Recreation		3.2				2.3	5.5
Sales		.1	.2	.3	.3		1.1
Project sales				1.2			1.2
Ranger headquarters	.2						.2
Travel (G)	1.0	.2				1.2	2.4
Excess	.4	.4					
8-hour days	10.0	11.5	4.0	7.2	5.5	13.2	51.6
Calendar days	9.4	10.4	4.0	6.4	5.0	12.0	47.4

In addition the inspection memos will, according to Benedict, require two hours each district.

PART 3.—*Mariposa district inspection*—Appendix

FROM—	TO—	JOB	NIGHT
Northfork.	Soquel by car.	Soquel guard inspection.	Soquel guard station.
Soquel.	Kelty R. S.—horse.	Pasture and guard.	
Kelty.	Behind Dome vicinity Tex Flat, Gray Mountain country.	Ranger inspection.	
First day.	Vicinity of Granite Cut around to Northfork Creek to lower end Soquel. Swing to west of Swigels mountain dropping back to slope of Wilder Creek and to camp via Ditch.		Hours F 1 G 7 L 1 9
Soquel.	Elder Grove Big Trees by car.	3 motor ways.	
Big Trees.	Junction, Big Creek, and Soquel Road.	Big Creek motor ways (20 miles).	
Junction, Big Creek, etc.	Fish Camp thence.	Miami station.	
While on this trip work out fire hazard reduction plan.			
Second day: Imp., 0.3; G., 0.2; F. lines 0.3 equals 1 day.			
Miami station.	Yosemite Mountain Club by car.	Inspect clubs imp. from fire standpoint.	F 1
Yosemite Club.	Miami station by car.		
Miami station.	Pilot Peak—afoot.	Inspect secondary L. O.	F 1
Pilot Peak.	Cedar Brook fire line along drive to Hogan Creek thence to Bruener Place. Met there by car by D. R.	Inspection.	F. line 3
		Inspect Samp. Plot.	P. R 1 L 1
Breuner Place.	Chowchilla Creek, thence via Grant Spring road to Midway thence to sale area Warman Bros.	Inspect 2 private camp grounds en route.	
		Inspect sale area	F. M 1 8
Third day.			Midway.
FROM—	TO—	MODE OF TRAVEL	JOB — TIME Hour
Midway.	Chowchilla	Car.	Inspect guard. F 1½
Chowchilla.	Cedar Creek boys camp.	Car.	Inspect boys camp. F ¼
Boys camp.	Mariposa R. S.	Car.	Inspect station guard. F ½
Mariposa R. S.	Cape Horn.	Car.	Inspect Hodson's fire lines. F. line 1
Cape Horn	Jersey Dale.	Car.	Inspect Scott sale. F. M 2

Jersey Dale.	Early Mine;	Car.	Inspect motor way and fire line—down fire line by car to Bear Creek, thence to Highway.	F. line	1½
Highway.	Indian camp for night.		En route, inspect private resorts, filling stations (5).	L	2½
					9¼
Fourth day.					
Indian camp.	El Portal guard station.	Car.	Inspect guard.	F	1
El Portal guard station.	Yosemite headquarters.	Car.	Inspect park officer.	P. R	2
Yosemite headquarters.	Black Jack.	Car.	Inspect Perioche motor way.	Imp	1
Black Jack.	B. P. R. road camp.	Car.	Interview Best and Wass.	P. R	1
			Inspect road foreman.	F	1¼
			Inspect public camp ground.	L	¼
			Inspect resort and special use.	L	1¼
B. P. R. camp.	Merced R. S. (park).	Car.	Interview Park R. fire.	F	1
Merced R. S.	Wawona.	Car.	Interview resort owner.	P. R	1
Wawona.	Miami R. S. for night.				
					9¾
Fifth day.					
Miami R. S.	Summit camp;	Log train.	Inspect Madera sale.	F. M	10
			Inspect Signal Peak L. O.	F	1
			Night at logging camp.		
					11
Sixth day.					
Logging camp.	Summit camp.	Train and foot.	Inspect guard and public camp ground.	F	2
			Range inspection.	G	1
Summit Camp.	Miami R. S.	Log. train.	Travel time guard inspection.		
Miami R. S.	Northfork.		Travel time range inspection.	G	1
					4
Seventh day.					

APPENDIX TO JOB-LOAD ANALYSIS

Inspection trips by A. K. Wofford, fire chief, covering the protection zone of the Sierra National Forest

From—	To—	Travel time (hours and minutes)	Kind of travel	Guard inspection (hours and minutes)	Stopping at industrial places and talking to the public en route	
					Number of stops	Hours and minutes
Northfork.	C. V. guard station.	1.15	Auto.	0.30	2	0.30
C. V. guard station.	Placer guard station.	3.00	Auto (staying all night).	.45	5	1.15
Placer station.	Kelty Md. station.	2.30	Auto.	.45	2	.30
Keltie Md. station.	Miami ranger station.	1.30	Auto (staying all night).	1.15	1	.30
Miami R. station.	Summit guard station.	1.30	Auto.	.30	2	.30
Summit guard station.	Signal Peak L. O.	1.00	Auto.	.45	1	.15
Signal Peak L. O.	S. P. camp No. 1.	.30	Auto (timber sale area staying all night.)	4.00		
S. P. camp Nos. 1 and 2.	Timber sale area.		Foot (Co. fire chief).			
S. P. camp Nos. 1 and 2.	Chowchilla guard station.	1.00	Auto (G. inspection).	.45	2	.30
Chowchilla guard station.	Scotts Mill.	1.00	Auto (staying all night—T. S. inspection).	1.30	1	.15
* * * * * *	* * * * * *	* * *	* * * * * *	* * *	* * *	* * *

Study of correspondence, supervisor's office, Sierra National Forest—Northfork

(Number of one-fourth pages, single space)

Designation	Received—		Written—					
			Supervisor		Staff		Executive assiatant	
	June 1, 1928 to Sept. 30, 1928	Oct. 1, 1928 to May 31, 1929	Summer	Winter	Summer	Winter	Summer	Winter
D.	5	42	2	1				
O.	719	1,074	50	126	38	187	338	591
F. A.	119	254	2	3	65	104	71	170
L.	389	1,099	20	112	14	41	168	449
S.	425	487	18	86	39	192	60	121
E.	263	611	20	103	11	125	37	94
∫R. S.	4	369		6		18	2	21
⌊R. G.		10				3		3
P. R.	67	280	50	85	3	8	45	40
G.	75	240	3	36	1	41	54	197
Z.	61	143	6	17	3	1	143	133
Total	4:2,127	4,609	4:171	575	4:174	720	4:918	1,819
	532	1,152	43	144	44	180	230	455
Grand total	6,736		746		894		2,737	

Total written in forest supervisor's office 4,377 (1,094 full pages).

APPENDIX TO JOB-LOAD ANALYSIS

MEMORANDUM BY EXECUTIVE ASSISTANT ROY BLOOD—SIERRA

Annually we have between 1,200 and 1,300 vouchers. These represent, for the most part, large items such as monthly accounts, fire items, etc. In other words, we curtail so far as possible the number of vouchers by paying wholesalers and local dealers but once a month, except in the case of fire bills and invoices on which discounts may be taken.

In connection with the State we expend annually approximately $8,000 in undeposited funds, using some 50 vouchers in this work. About the same number of vouchers is used in the expenditure of undeposited cooperative moneys from the counties.

During the summer months we employ about 24 guards, 2 road construction and 1 trail maintenance crew, with about 3 smaller trail maintenance outfits.

Our gross receipts for 1928 will exceed $325,000 covered by some 1,400 letters of transmittal. This money is from varied classes of users, such as:

30 timber sales.
150 grazing permits.
200 fire cooperators.
40 miscellaneous cooperators.
625 special-use permits.
2 power projects.

Our expenditures run around $115,000 per year, not taking into account the undeposited funds referred to above. Fire expenditures, of course, vary according to the type of season encountered.

Diary analysis and study of effective field time

Sierra National Forest—Supervisor. Date: June 4, 1929
Year: 1928.

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Sundays, holidays, leave	7½	5	4½	4	3	1	5	½	4	3½	5	14½	57½
NONFIELD													
Headquarters and office	17½	15	12	15	12½	9	5½	4½	10	9	16	9½	135½
Headquarters Imp													
Mail and supplies													
Forage and P. O. E													
S. conferences			1					2	3	2			8
Dispatcher							2	4	1½				7½
Inspectors													
Supervisor's office													
Total days	17½	15	13	15	12½	9	7½	10½	14½	11	16	9½	151
FIELD TIME													
F. S. P. Co. sale					3	3	2		2	4½	1		15½
M. S. P. Co. sale				½	1	1	½	½	1				4½
Northfork district							5		2	½			7½
Mariposa district					2	3	2	2					9
Pineridge district				½	2½		1	3		1			8
Dinkey					½								½
High Sierra district								1					1
Kings River					1		1						2
Fire line inspection—Minaret		1	1½	1						½			4
Claims and exchange conferences	1½			½									2
With Inspectors		2	1			1	3	9½	2½		3½		22½
Off forest meetings and talks	4½	5	3½	8	5	2	½	2	1½	7	½	5	44½
S. conferences			1½	½			1						3
Fighting fire					½		1½		½				2½
Guard meeting						2							2
Miscellaneous			½				1		2				3½
Show me						1	1						2
Frisco			5½							3			8½
Total field days	6	8	13½	11	15½	13	19½	18	11½	16½	5	5	142½
Court											4		4
Book review												2	2

FORM 593 TIME AND METHOD STUDIES

STUDY NO. _____ DATES _____

OPERATION _____ OBSERVER _____

Location _____ | Field Record (Hrs. & Mins.) El. | Start | Stop | Time | Quantity

Description of Operation (refer to check list) _____

Summary by Elements

Time	Time	Time	Time	Time	Time	Time	Time	Time

Elements and Symbols	Total Time	Total Quantity	Ave. Time	Ave. Cost
Total and Averages				

Adapted by J. B. Byrne from LICHTNER, W. O. *(19)*

INSTRUCTIONS FOR USE OF FORM 593, TIME AND METHOD STUDIES

The name of the operation to be studied should be entered next to "operation," then the observer's name and the dates on which the field record was taken. The operation is broken up into its "elements" or steps, that is, the successive jobs which make up the operation and which may be timed as units. The elements are listed at the lower left under "Elements and Symbols" with a letter or number assigned to each element. The symbols may be the successive letters in the alphabet, but are more convenient to use if they suggest the job as "m," marking, "s," scaling, "r," cutting reports, etc.

In the "Field Record" enter the symbol of the element to be timed under "E1." Record the time of starting under, "Start." When the step is completed enter the time (in hours and minutes) under "Stop." The difference between the two is entered next under "Time" with the quantity handled (such as volume scaled, miles walked, splices made, etc.) entered in the right hand column.

The assembling of the field data is done under "Summary by Elements." The various element symbols are entered on the first line and immediately under the times taken and quantities handled for each element. Total time and total quantities are shown on the bottom line and transferred to the first two columns so labeled opposite the list of elements.

"Average time" is the "Total time" divided by the "Quantity," "Average cost" is based on the hourly rate of the man observed. These last two headings are divided to permit the use of more than one unit of measure. Timber sales may be shown per M Bd. ft. and per sale. Improvement jobs may be shown per mile and per day.

This form can be used in studying any one of a variety of operations, for example; one sale, a group of small sales, telephone constructions, etc. Under "Location" give the name and general location of the job being studied.

A rather detailed description of the job must be written. For example, the following check list includes the essential information to be recorded on the study of a timber sale. A similar check list should be prepared in the case of other jobs being studied. These data are recorded under "Description of Operation."

CHECK LIST OF DESCRIPTIVE DATA NEEDED IN STUDYING A TIMBER SALE

Species marked by percentages _____% _____% _____% (omit scattered species).
Average volume marked per acre _____.
Average number marked trees per M _____.
Average number scaled logs per M _____.
Slope very steep _____ steep _____ rolling _____ level _____.
Understory very dense _____ dense _____ light _____ open _____.
Volume cut is _____% higher than the volume marked.
(For example—if hemlock is not marked but will constitute 30% of the volume cut show 30%—if all species are marked show 0%.)
Average per cent of defect in scaled logs _____%.
Average number 16-foot logs per M _____.
Scaling done with assistance in—
Numbering _____. Looking at opposite ends _____ Tallying _____.
Stamping _____. No help _____.

SAMPLE TIME AND METHOD STUDIES

By rangers and members of the supervisor's staff, Nantahala National Forest

Study A–1 is one of four carried on to gain an idea of the time cost of examining small tracts for purchase.

The tree-scale tie-sale study was made by the junior forester on the Nantahala and follows a day of handling group sales in South Carolina. This study is one of a number made to find the total time cost of handling small sales of low-grade products in groups by watersheds. This particular sheet covered the last day of the trip and includes return to ranger-district headquarters. A summary sheet will average this charge against the total volume handled for the trip.

Summaries made at the time of some of the studies are attached to give a better idea of their application to our work.

Study O–1 was on tree-line construction to find the average time per mile for brushing out, both ground and overhead where these two operations are carried on separately. In lengthy jobs like this it is desirable for the observer to work

as one of the crew, since there is nothing he can do on the study but make the entries at widely separated intervals of time. Distances were easily measured by speedometer because the line followed an old road accessible to a car. Along a trail through the woods I can see no way to obtain accurate distances, except by the log wheel used to measure trails.

Study O–2 was made on a pole-line construction job to determine the number of poles set per effective 8-hour day. The observer worked as one of the crew here, but probably better time would have been made if a fireguard or laborer had taken his place. However, to start with it was done as a means of securing better cooperation from the men. Only two steps were recorded, setting the poles and travel, which included preparing the next pole for setting.

The studies are merely beginning on those parts of projects which could be most easily worked in with administration routine last year. The form has provided means of recording and computing the information we have so far obtained. It is rather large for convenient field use where a crew foreman or member is using it at the same time he is working on the job. It was designed for the large aluminum holder, but by folding once in the middle and part way up from the bottom, it can be fastened in an 874-size holder with field record exposed for entries.

In summarizing the units of time the "hours and minutes" are constantly giving trouble. They must be converted to hours and hundredths for computing, and then back again.

JOHN B. BYRNE,
Assistant Forest Supervisor.

APRIL 28, 1931.

MEMORANDUM ———

TIME AND METHOD STUDIES

A record of the time required for the examination of small tracts for purchase was made by Ranger Wilson in November and December, 1930. Three tracts, measuring 28, 53, and 73 acres, respectively, were examined by a 2-man crew with the ranger. One tract of 10 acres was examined by Ranger Wilson alone, pacing the distances between established corners. Volume per acre varied from 2,500 feet on the smallest area to 4,900 feet on the largest. Topography varied from moderate to steep slopes except in tract 4, which was less broken up than the others. Undergrowth was medium to heavy laurel cover.

The time record by tracts is shown on the attached table. Automobile travel time was recorded in the study, but is disregarded in the summary.

Running-strip averages 13.4 chains per hour for the 3 tracts chained or 107 chains per 8-hour day. On the tract where pacing was done, it took 1 hour to make 20 chains, a rate of 161 chains per day. Both of these figures are lower than the estimated average in the past. We have been figuring on 200 chains per day. The lower rate on small tracts may be due to frequent offsets and the necessary interruptions and halts of starting and finishing.

Total costs on each tract based on the hourly rate of the crew members (0.96 and 0.38) is as follows:

	Total	Per acre
10-acre tract	$1.32	$0.132
28-acre tract	4.35	.155
53-acre tract	9.95	.188
73-acre tract	10.61	.146

The above figures also exclude time consumed in automobile travel.

Foot-travel time is not affected by the size of the tract, but is a more constant and dependable figure than car travel. The former remains the same for each tract, but car-travel time depends on the point from which the car starts.

JOHN B. BYRNE,
Assistant Forest Supervisor.

Sample—Time and method studies

Form 593.
Study No.: A-1.
Operation: Land examination (small tracts).

Dates: November 18, 1930.
Observer: T. A. W.

Location:
Little Buck Creek, Mount Mitchell division, Pisgah National Forest, C. H. Snipes tract No. 473

Description of operation (refer to check list):
Tract of 28 acres in area. Stand per acre, 2,904 feet. Lower slope type. Topography, moderate to steep. Undergrowth, medium to heavy. 2-man crew. Compass man tallies and pulls tape. Estimator calls trees and uses Biltmore stick

Field record (hours and minutes)

Element	Start	Stop	Time	Quantity
A	1:00	1:15	:15	7 miles.
W	1:15	1:20	:05	¼ mile.
L	1:20	2:00	:40	½ mile.
S	2:M	4:20	2:20	35 chains.
W	4:20	4:30	:10	¾ mile.
A	5:00	5:30	:30	20 miles.

SUMMARY BY ELEMENTS

A		W		L		S							
Time	Miles	Time	Miles	Time	Miles	Time	Chains	Time		Time		Time	
:15 :30	7:0 20:0	:05 :10	:25 :75	:40	:50	2:20	:35						
:45	27:0	:15	1:00	:40	:50	2:20	:35						

ELEMENTS AND SYMBOLS	Total time	Total quantity	Average time		Average cost	
A=Travel by auto.	:45	27:0				
W=Travel by foot.	:15	1:00				
L=Locating tract and tracing lines.	:40	:50				
S=Running strip.	2:20	:35				
Total and average.	[1] 3:15					

[1] Exclusive of auto travel.

	No. 3 (10 acres) (2,595 feet per acre)		No. 1 (28 acres) (2,904 feet per acre)		No. 4 (53 acres)		No. 2 (73 acres) (4,869 feet per acre)	
	Hours and minutes		*Hours and minutes*		*Hours and minutes*		*Hours and minutes*	
Travel by foot	0:07	0.30 mile	0:15	1.00 mile	1:10	4.50 miles	0:35	2.00 miles.
Locating tract and tracing lines.	:15	0.25 mile	:40	0.50 mile	:30	1.00 miles	1:20	0.25 mile.
Running strip	1:00	20 chains (pacing).	2:20	35 chains	5:45	73 chain	6:00	80 chains.
Total	1:22		3:15		7:25		7:55	

Sample—Time and method studies

Form 593.
Study No.: ———.
Operation: Tie sales (tree scale).

Dates July 18, 1930.
Observer: J. H. S.

Location:

Description of operation (refer to check list):
Group sales to tie cutters in pine hardwood region of upper Piedmont. Total stand per acre, 2,500 feet. Tie volume not over 300 feet an acre. Moderate slopes, little undergrowth. 2 men marking and tallying ocular estimate. Ties will be hewn and trees are not over 16 inches d. b. h. (average 2 ties per tree or slightly better). Final travel is return to headquarters. All travel by auto. Areas accessible. Foot travel is at a minimum.

Field record (hours and minutes)				
Element	Start	Stop	Time	Quantity
X	7:20	7:57	:37	13 miles.
A	7:57	8:20	:23	3 applicants.
T	8:20	9:20	1:00	6 miles.
M and S	9:20	12:25	3:05	920 ties.
		REST		
T	12:35	1:17	:42	10 miles.
		DINNER		
M and S	1:42	4:15	2:33	665 ties.
X	4:15	4:45	:30	9 miles.
X	4:45	6:30	1:45	37 miles.

SUMMARY BY ELEMENTS

X		A		T		M and S							
Time	Miles	Time	No.	Time	Miles	Time	No.	Time		Time		Time	
:37	13	:23	3	1:00	6	3:05	920						
:30	9			:42	10	2:33	665						
1:45	37												
2:12	59	:23	3	1:42	16	5:38	1,585						

Sample—Time and money studies—Continued

ELEMENTS AND SYMBOLS	Total time	Total quantity	Average time;		Average cost	
			Per 100 ties		*Per 100 ties*	
X=Travel time in and out.	2:12	59	:08		.53	
A=Conference with applicants.	:23	3	:01		.04	
T=Intersale travel.	1:42	16	:06		.07	
M and S=Marking and estimating.	5:38	1,585	:21		.70	
Total and average.			:36		1.34	

ELEMENTS AND SYMBOLS	Total time	Total quantity	Average time		Average cost	
A=Travel by auto.	:45	27:0				
W=Travel by foot.	:15	1:00				
L=Locating tract and tracing lines.	:40	:50				
S=Running strip.	2:20	:35				
Total and average.	[1] 3:15					

[1] Exclusive of auto travel.

Field record (hours and minutes)

TIME AND METHOD STUDIES—TREE-LINE CONSTRUCTION (YELLOW GAP LINE—BRUSHING OUT RIGHT OF WAY

From August 13 to 15, inclusive, a time study was made of a telephone-construction crew on the Pisgah district. Game wardens made up the crew with help most of the time from the ranger and the assistant supervisor, who was making the study. The three days were confined to brushing out the right of way, this job being completed for a given line before the wire was strung. The crew varied from four to five men.

The results show an average actual job time of 3.57 hours per mile or 2¼ miles per 8-hour day for the 5-man crew. The 4-man crew showed slightly higher speed, but not enough figures were obtained to be representative.

The line was hung almost entirely on trees and followed a road for over 85 per cent of its distance. The area was cut over from 3 to 10 years ago. There was almost no slash on the ground. Undergrowth was laurel, rhododendron, and scrub oak, medium to dense, and saplings 3 to 10 years old.

JOHN B. BYRNE,
Assistant Forest Supervisor.

OCTOBER 8, 1930.

Form 593

Sample—Time and method studies

Study No.: O-1.
Operation: Brushing out for tree line.

Dates: August 13-15, 1930.
Observer: J. B. B.

Location.
Yellow Gap line, Pisgah Division, Pisgah National Forest.

Description of operation (refer to check list):
Line is hung almost entirely on trees. Follows road 85 per cent of distance. Area was cut over 3 to 10 years ago. No slash on ground. Undergrowth is laurel and scrub oak for 2 miles, then 3 to 10 year old saplings with heavy rhododendron growth in coves. Slope is practically level for 2 miles, then gently sloping for a mile, then moderately steep to rough.

Field record (hours and minutes)				
Element	Start	Stop	Time	Quantity
B	9:46	12:10	2:24	0.9 mile (5-man crew).
B	9:30	11:45	2:15	1.5 miles (5-man crew).
B	12:20	4:15	3:55	
T	4:15	4:45	:30	5.6 miles.
B	9:00	11:40	2:40	0.8 mile (4-man crew).
O	1:15	4:20	3:05	2.4 miles (4-man crew).

SUMMARY BY ELEMENTS

B (5 men)				O		T		B (4 men)					
Time		Time		Time		Time		Time		Time		Time	
		2:24 6:10	0:9 1:5	3:05	2:4	:30	5:6	2:40	0:8				
		8:34	2:4	3:05	2:4	:30	5:6	2:40	0:8				

ELEMENTS AND SYMBOLS	Total time	Total quantity	Average time		Average cost	
			Per mile			
B=Brushing out from ground:						
(5-man crew)	8:34	2:4	3:42			
(4-man crew)	2:40	0:8	3:24			
O=Overhead limbing and felling trees (4-man crew)	3:05	2:4	1:17			
T=Travel by car (no fast travel)	:30	5:6	:05			
Total and average						

A. S. (O).
Pisgah.
Time and method studies, (O-2).

MEMORANDUM FOR SUPERVISOR

A time and method study was made on the pole-line construction job on Buck Creek, Mount Mitchell district, on November 18 and 22. The study covered 10 hours effective time and the setting of 23 poles. The operation was more difficult than the average of its kind because the poles were set mainly in the loose rocky fills on the lower side of the new Buck Creek Highway (No. 104). Poles were 20 feet and 25 feet, with an occasional 35 feet in low places off the road.

The crew on November 18 was composed of four men including the observer. On the 21st, a fifth man was added to the crew. On each day one man went ahead, while others were filling and tamping poles, to trim the tip of the next pole and nail on the brackets. This man also installed the lightning conductors on every tenth pole. Some time was lost cleaning out holes which had filled in, due either to rain or the natural sliding in of the soft dirt. In two cases, new holes had to be made.

The 4-man crew on the 18th took on an average of 28 minutes to set a pole (17 poles per 8-hour day). The 5-man crew averaged over 29 minutes per pole (17 poles per day). This apparent discrepancy was caused by the difficulty in setting a 35-foot pole in the brush off the road where the road fill made the use of the pike poles difficult. Time consumed was over an hour. The rest of the 12 poles timed required something over 19 minutes per pole (nearly 25 poles per 8-hour day). Since the need for large poles occurs in several places on the line, the time required for setting them must be considered.

Some increase in speed should be obtained by digging only enough holes to last the setting crew two days at a time. If this is done, the holes are not so likely to catch dirt and rocks, and the rain does not have a chance to wash in the sides. Also, the trimming of the tip and nailing on of insulators might well be done by one man before the crew starts.

On the basis of the material secured for a 4-man crew, an average day's work under these conditions should be from 17 to 20 poles. A 5-man crew should average from 20 to 23 poles.

These figures are of course subject to change if further records by the ranger in charge of the work should justify it. The desirability of keeping these records is urged as a basis for better estimates in our work plans. The study form allows considerable flexibility in the nature of jobs which may be checked. It is not desired to see how fast a job can be done, but what should be a reasonable allowance for doing it well. In the course of a study, some improvements in method also will usually suggest themselves.

The field check is attached.

JOHN B. BYRNE,
Assistant Forest Supervisor.

NOVEMBER 26, 1930:

Sample—Time and method studies

Form 593.
Study No.: O-2.
Operation: Setting poles (telephone).

Dates: November 18, 1930.
Observer: J. B. B.

Location:
Buck Creek, Mount Mitchell division, Pisgah National Forest.

Description of operation (refer to check list):
Line follows Buck Creek road, a surfaced highway. 4 men were in crew; 1 gabled tip of pole and fastened brackets. Others cleaned out holes already dug and carried bowlders for packing around pole. After we got started the first man went ahead and did his work while the other 3 were filling in and tamping. Holes mainly in soft dirt of fills on outside of highway.

Field record (hours and minutes)				
Element	Start	Stop	Time	Quantity
S	12:35	12:44	:09	
T	12:44	1:01	:17	
S	1:01	1:15	:14	
T	1:15	1:34	:19	
S	1:34	1:45	:11	
T	1:45	1:52	:07	
S	1:52	2:26	:34	(3 trees, very difficult location.)
T	2:26	2:30	:04	
S	2:30	2:51	:21	
T	2:51	3:05	:14	
S	3:05	3:19	:14	
T	3:19	3:35	:16	(Broken pike pole.)
S	3:35	3:55	:20	
T	3:55	4:02	:07	
S	4:02	4:16	:14	
T	4:16	4:20	:04	
S	4:20	4:36	:16	
T	4:36	4:55	:19	
S	4:55	5:11	:16	

SUMMARY BY ELEMENTS

S		T											
Time		Time		Time		Time		Time		Time		Time	
:09		:17											
:14		:19											
:11		:07											
:34		:04											
:21		:14											
:14		:16											
:20		:07											
:14		:04											
:16		:19											
:16													
169	10	107	9										

ELEMENTS AND SYMBOLS	Total time	Total quantity	Average time	Average cost
			Per pole	
S=setting poles (from time pole is started up to final tamping).	169	10	:17	
T=travel between poles, gabling tops, placing 2 brackets and laying pole in position for raising.	103	9	:11	
Total and average			[1] :28	

[1] 17+poles per 8-hour day.

Time study of visitors interviewing supervisor—Chippewa National Forest—R-9, 1930—Howard Hopkins

Month	Semiofficial visitors			Other visitors			Total visitors			Average per visitor		Number 8-hour days in office	Percent of total time in office
	Number of visitors	Time consumed	Government time warranted	Number	Time consumed	Government time warranted	Number of visitors	Total time consumed	Government time warranted	Actual	Warranted		
June	7	3 hr., 8 min.	1 hr., 20 min.	8	5 hr., 0 min.	3 hr., 50 min.	15	1 da., 0 hr., 8 min.	5 hr., 10 min.	32 min.	21 min.	10.4	31
July	30	2 da., 4 hr., 0 min.	1 da., 5 hr., 39 min.	22	1 da., 2 hr., 0 min.	7 hr., 45 min.	52	3 da., 6 hr., 0 min.	2 da., 5 hr., 24 min.			25.5	78
August	23	2 da., 2 hr., 57 min.	1 da., 5 h., 20 min.	27	1 da., 5 hr., 55 min.	6 hr., 41 min.	50	4 da., 0 hr., 52 min.	2 da., 4 hr., 1 min.			19.9	61
September	25	1 da., 5 hr., 35 min.	1 da., 3 hr., 25 min.	32	2 da., 0 hr., 0 min.	1 da., 1 hr., 45 min.	57	3 da., 5 hr., 35 min.	2 da., 5 hr., 10 min.		22 min.	16.5	50
October	15	7 hr., 15 min.	4 hr., 35 min.	19	1 da., 2 hr., 15 min.	6 hr., 25 min.	34	2 da., 1 hr., 30 min.	1 da., 3 hr.			17.5	48
November	11	5 hr., 0 min.	4 hr., 5 min.	19	7 hr., 50 min.	5 hr. 0 min.	30	1 da., 4 hr., 50 min.	1 da., 1 hr., 5 min.	26 min.	18 min.	24.4	73
Total, 6 months	111	8 da., 3 hr., 55 min.	6 da., 0 hr., 24 min.	127	7 da., 7 hr., 0 min.	4 da., 7 hr., 26 min.	238	16 da., 2 hr., 55 min.	10 da., 7 hr., 50 min.			114.2	55
Average per month	18½	1 da., 3 hr., 19 min.	1 da., 0 hr., 4 min.	21⅙	1 da., 2 hr., 30 min.	6 hr., 34 min.	39⅔	2 da., 5 hr., 49 min.	1 da., 6 hr., 38 min.			19.0	55
				Average	30 min.	19 min.	Average	33 min.	25 min.	33 min.	25 min.		

[1] Includes rangers, lake States forest experiment men, county officials, game wardens, land office men, crew foremen, etc. Does not include visits by inspectors.

Dictation time study—Chippewa National Forest—1930

Date	Dictating time (minutes)	Number of letters	Number of inches of single-spaced type [1]	Number of minutes per inch single space	Remarks
Feb. 28, 1930	24	7	14.35	1.64	
Mar. 1, 1930	9	3	11.00	0.82	
Mar. 14, 1930	52	14	34.60	1.52	
Mar. 22, 1930					
Mar. 26, 1930	42	12	32.40	1.30	
Apr. 2, 1930	60	13	35.60	1.70	
Apr. 8, 1930					
Apr. 14, 1930	60	14	35.10	1.71	
Apr. 19, 1930	56	8	38.60	1.45	
Apr. 26, 1930	50	8	30.40	1.64	
May 3, 1930	43	14	34.30	1.25	
May 16, 1930					
May 24, 1930	70	17	41.90	1.67	
May 29, 1930	35	4	23.30	1.50	
June 3, 1930	8	1	5.2	1.54	
June 12, 1930	10	1	10.2	.98	Sale inspectors memo. (W. R.)
June 20, 1930	80	7	40.2	1.99	4 sale inspectors memos, Bend district.
July 9, 1930	55	13	35.0	1.57	
July 11, 1930	47	15	35.5	1.33	
July 1, 1930	43	10			
July 17, 1930					
July 24, 1930	50	16	34.8	1.43	
July 28, 1930	60	16	37.2	1.61	
Aug. 1, 1930	46	4	20.9	2.20	
Aug. 5, 1930	28	6	14.4	1.94	
Aug. 6, 1930	10	1	7.0	1.43	
Aug. 8, 1930	28	8	11.3	2.48	Started use of new typewriter, elite type.
Aug. 20, 1930	45	15	31.1	1.41	
Aug. 23, 1930	43	16	23.9	1.80	
Aug. 28, 1930	35	14	18.6	1.88	
Sept. 2, 1930	48	11	27.7	1.73	
Sept. 12, 1930	37	9	16.6	2.23	
Sept. 18, 1930	40	9	20.2	1.98	
Sept. 20, 1930	18	7	12.9	1.40	
Sept. 24, 1930	35	8	22.6	1.55	
Sept. 29, 1930	45	9	15.2	2.96	
Oct. 2, 1930	44	11	24.4	1.80	
Oct. 10, 1930	55	18	33.7	1.33	
Oct. 16, 1930	38				
Oct. 18, 1930					
Oct. 29, 1930	65	15	37.4	1.74	
Nov. 7, 1930	68	18	38.7	1.76	
Nov. 18, 1930	60	19	30.5	1.96	
Nov. 26, 1930	25	10	13.8	1.81	
Nov. 29, 1930	55	16	39.1	1.41	
	1,722	417	989.65		

[1] Space of typed letters measured, does not include address, paragraph "Reference is made" or ending. Only body of letter is measured. Time allowed includes time during dictation in referring to references and discussion with clerk. Letters double space reduced to single space by measuring and dividing by two or entering one-half measured space.

Average 15 minutes per page, single spaced.

TIME AND METHOD STUDIES

An example of less detailed, but nevertheless highly interesting and valuable time and method studies, which furnish data for strengthening the analyses, is given as follows by Ranger John W. Johnson in charge of the Pecos district, Santa Fe National Forest. "The American Metals Co.'s demand for mine timber reached what was thought to be a high-water mark in April when 65,000 linear feet of round timber up to 15 inches in diameter were used, but the amount has steadily climbed until it is now running between 72,000 and 80,000 per month. Inferior species as white fir, cork bark fir, and blue spruce, go right in with the better timber, which gives an opportunity to clean up the stand. White fir up to 30 inches d.b.h. is cut, and the oversize butt is left on the ground—it is generally rotten anyway. When this company started operations an attempt was made to scale the material at the mine yard, but it took so much time (because of insufficient yard room I had to scale two or three times each week) that it was discontinued and sales made by tree measurement. At first the trees were not numbered—simply tallied in the sale book under column headings showing the contents of the tree. This method did not give any chance for check scale and was not according to the Scaling Manual, so each tree is now numbered and its contents recorded so that a check can be made. Estimating in this way, *two men average 500 trees per day, but one man can measure 400*, so it is not profitably a 2-man job. Deductions for defect are made when the tree is marked and the only guide is exterior appearance, the sound when the axe hits it, and one's knowledge of rot habits in each species. The October check sale of 55 trees taken at random shows an error of 1.55 per cent and the November check of 102 trees shows an error of 2.52 per cent. More than 6,000 trees have been marked since early in October. This sale is an A–1 thinning in Douglas fir and Englemann spruce types and incidentally brings the highest stumpage in b.m. that we know of in the region excepting walnut."

LITERATURE CITED

(1) American Council on Education.
1927. instructions for writing job specifications. Ed. Rec. Sup. 5, 40 p.

(2) Babcock, G. D.
[1929]. research for production. *In* Person, H. S., ed., Scientific Management in American Industry, Ch. VII, p. 74–93, illus. New York and London.

(3) Beard, C. A.
1930. government by technologists. New Repub. 63:115–120.

(4) Bergen, G. A.
1929. uses of job study. Amer. Mangt. Assoc. Personnel 6 (3):85–100.

(5) Bode, B. H.
1930. the new education ten years after. I: apprenticeship or freedom? New Repub. 63:61–64.

(6) Brinkman, E. E.
1930. robots or men. By H. Dubreuil. [Review by Brinkman] Mangt. Rev. 19:313–314.

(7) Bryant, L. E., and Schulz, G. E.
[1929]. factory operation standards. *In* Person, H. S., ed., Scientific Management in American Industry, Ch. XV, p. 196–226, illus. New York and London.

(8) Cooke, M. L.
1917. who is boss in your shop? individual vs. group leadership and their relation to consent and the ideals of democracy. Taylor Soc. Bul. 3 (4):3–10.

(9) Fernow, B. E.
[1902]. economics of forestry; a reference book for students of political economy and professional and lay students of forestry. 520 p. New York.

(10) Frederick, J. G.
1922. business research and statistics. 342 p., illus. New York and London.

(11) Goldmark, J.
1913. fatigue and efficiency; a study in industry. 342 p. Philadelphia.

(12) Hathaway, K.
1930. methods of study; the principles and technique of analyzing work methods. Taylor Soc. Bul. 15:[210]–245.

(13) Hopf, H. A.
1927. improving management through job analysis. Amer. Mangt. Assoc., Ann. Conv. Ser. 62, 28 p. [Includes discussions by Kenagy and others.]

(14) Keir, J. S., and Dennison, H. S.
[1929]. control of sales operations. *In* Person, H. S., ed., Scientific Management in American Industry, Ch. XX, p. 291–307, illus. New York and London.

(15) Kelly, C.
1930. job analysis as a basis for payment according to output. Amer. Mangt. Assoc., Off. Mangt. Ser. O. M. 53, 16 p.

(16) Kendall, H. P.
1930. the development of the art and science and philosophy of management since taylor. Soc. Indus. Engin. Bul. April, 1930, p. 4–6. [Original not seen. Review in Mangt. Rev. 19:260–261.]

(17) [Keplinger, P.]
1931. organization, a study of principles and trends. U. S. Dept. Agr., Forest Serv. Lesson 2, 33 p. [Discussions Lesson 2, 14 p., separately paged.]

(18) ———
1931. organization, a study of principles and trends. U. S. Dept. Agr., Forest Serv. Lesson 7, 27 p. [Discussions of Lesson 7, 27 p., separately paged.]

(19) LICHTNER, W. O.
1921. TIME STUDY AND JOB ANALYSIS AS APPLIED TO STANDARDIZATION OF METHODS AND OPERATIONS. 397 p., illus. New York.
(20) LITTELL, P.
1930. [HERBERT CROLY] AS A FRIEND. New Repub. 63:243–245.
(21) MCCLURE, M. T.
1923. HOW TO THINK IN BUSINESS. 173 p. New York and London.
(22) MERRICK, D. V.
1919. TIME STUDIES AS A BASIS FOR RATE SETTING. 366 p., illus. New York.
(23) MITCHELL, T. W.
[1929]. PRACTICAL ASPECTS OF THE DEVELOPMENT AND USE OF STANDARDS. *In* Person, H. S., ed., Scientific Management in American Industry, Ch. XVII, p. 242–259. New York and London.
(24) PERSON, H. S.
[1929]. THE ORIGIN AND NATURE OF SCIENTIFIC MANAGEMENT. *In* Person, H. S., ed., Scientific Management in American Industry, Ch. I, p. 1–22. New York and London.
(25) ———
[1929]. THE NEW ATTITUDE TOWARD MANAGEMENT. *In* Person, H. S., ed., Scientific Management in American Industry, Ch. II, p. 23–34. New York and London.
(26) ———
[1929]. INSPECTION OF PHYSICAL STANDARDS. *In* Person, H. S., ed., Scientific Management in American Industry, Ch. XXIII, p. 377–384. New York and London.
(27) ———
[1929]. INSPECTION OF PERFORMANCE. *In* Person, H. S., ed., Scientific Management in American Industry, Ch. XXIV, p. 385–397, illus. New York and London.
(28) SCOTT, W. D., CLOTHIER, R. C., and MATHEWSON, S. B.
1931. PERSONNEL MANAGEMENT; PRINCIPLES, PRACTICES, AND POINT OF VIEW. Ed. 2, 583 p., illus. New York and London.
(29) STRONG, E. K., JR., and UHRBOCK, R. S.
1923. JOB ANALYSIS AND THE CURRICULUM; WITH SPECIAL REFERENCE TO THE TRAINING OF PRINTING EXECUTIVES. 146 p. Baltimore.
(30) TAYLOR, F. W.
1912. SHOP MANAGEMENT. 207 p. New York and London.
(31) [UNITED STATES] CHAMBER OF COMMERCE.
1925. COST ACCOUNTING THROUGH THE USE OF STANDARDS. 54 p. (Reprint 1931.)
(32) [UNITED STATES CONGRESS] HOUSE OF REPRESENTATIVES, SPECIAL COMMITTEE.
1912. HEARINGS . . . TO INVESTIGATE THE TAYLOR AND OTHER SYSTEMS OF SHOP MANAGEMENT, UNDER AUTHORITY OF H. RES. 90. V. 3. Washington, D. C.
(33) VERNON, H. M.
1921. INDUSTRIAL FATIGUE AND EFFICIENCY. 264 p., illus. London and New York.

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